



May 3, 1999 Oklahoma / Kansas Tornado Outbreak

* *Wichita*

* *Oklahoma City*

* *Chickasha*

Initial Convective
Towers



05/03/99 03:15 PM CDT

NOAA PROFILER NETWORK



TECHNICAL REVIEW

JANUARY 30, 2001

NOAA PROFILER NETWORK TECHNICAL REVIEW

Introduction and Highlights

Presented by
Margot H. Ackley

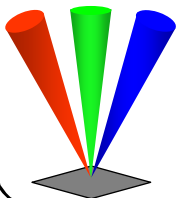
SUPPORT STAFF

Donald Acheson

Carol Bliss

Kathleen McKillen

January 30, 2001



NOAA PROFILER NETWORK

TECHNICAL REVIEW

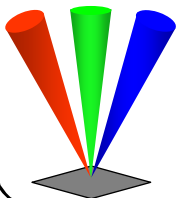
January 30, 2001

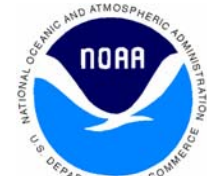
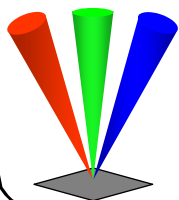
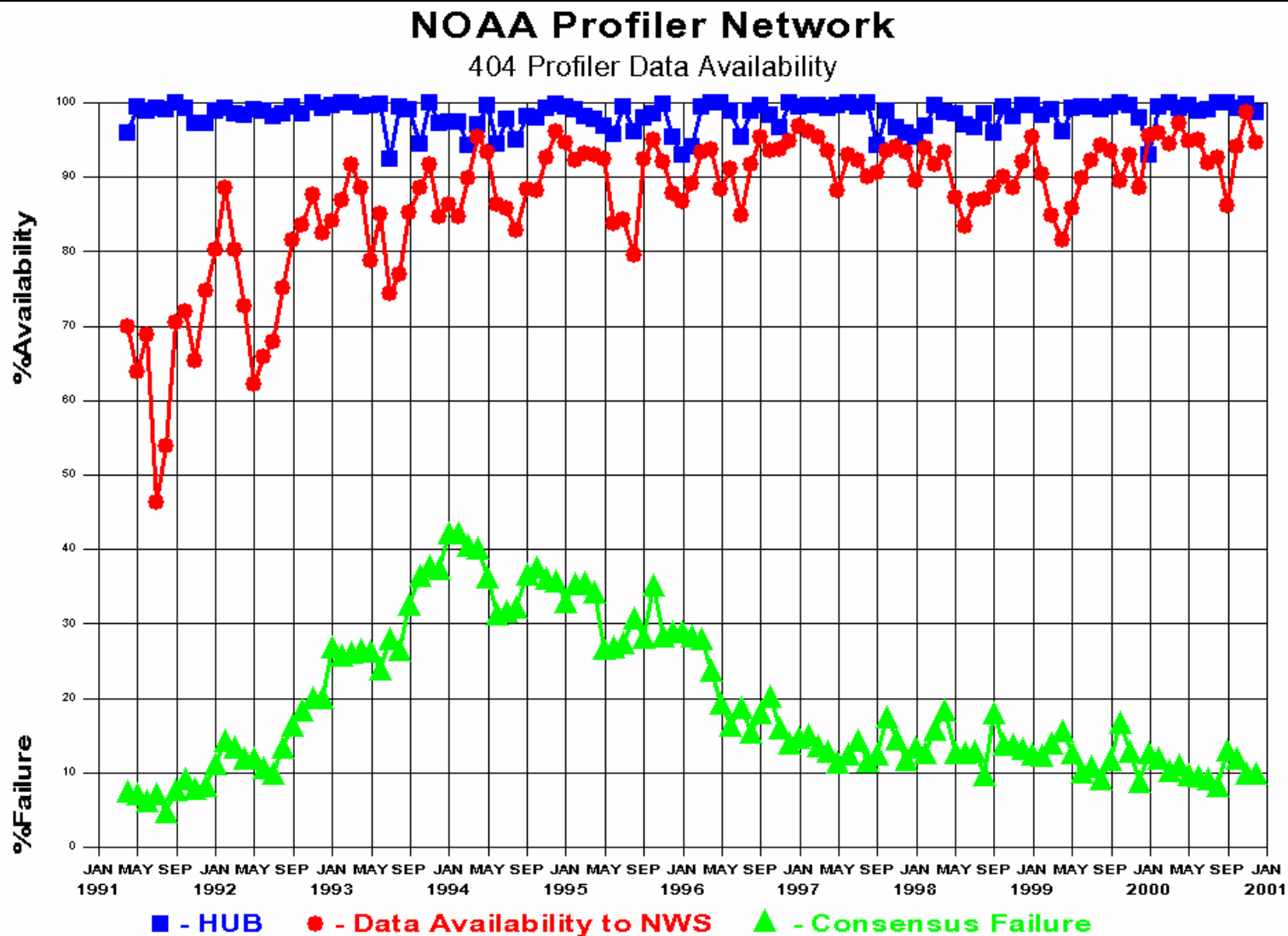
AGENDA

- Introduction and Highlights M. Ackley
- NPN Operations, Capability and Results D. van de Kamp
- Software Development and Web Services A. Pihlak

BREAK

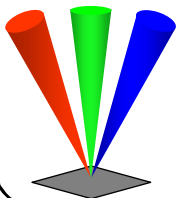
- Facilities and Systems Administration B. Kelley
- Engineering and Field Support M. Shanahan
- Future Focuses and Summary M. Ackley



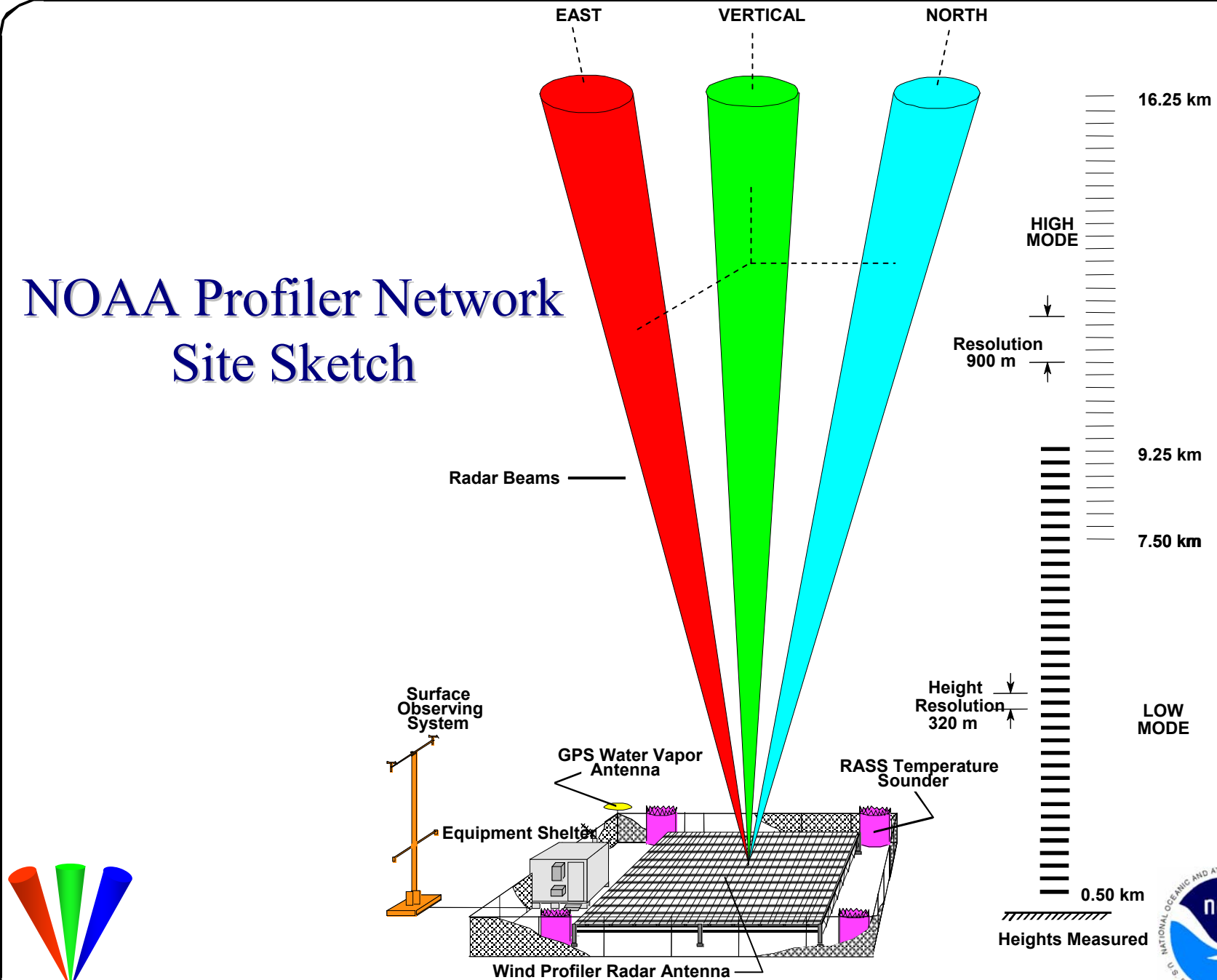


Highlights of Last 3 Years

- Observing System Expansion and Enhancements
- Processing, Monitoring and Survivability Improvements
- Delivery of Data to Customers
- Programmatic Achievements



NOAA Profiler Network Site Sketch



Highlights of Last 3 Years

Observing System Expansion and Enhancements

Brought 3 NWS Alaska 449 Profilers to full operations

Installed Profiler at Wolcott IN

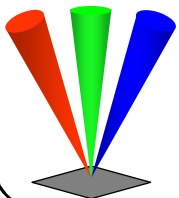
Operated Boundary Layer Profiler (BLP) at Genoa CO

Increased number of BLP's of opportunity by 25%

Relocated Neodesha KS Profiler to allow RASS capability

Relocated Profiler from Bloomfield CT to Syracuse NY

Converted Syracuse Profiler to 449 Mz **operational** frequency



Observing System Expansion and Enhancements

Installed GPS antennas/receivers for moisture data at all NPN sites

Installed surface meteorological systems at all NPN sites

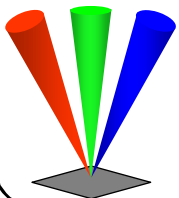
Procured 2 RASS systems for Neodesha KS and Palestine TX

Procured 11 modernized on-site data processors

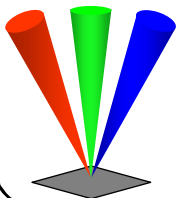
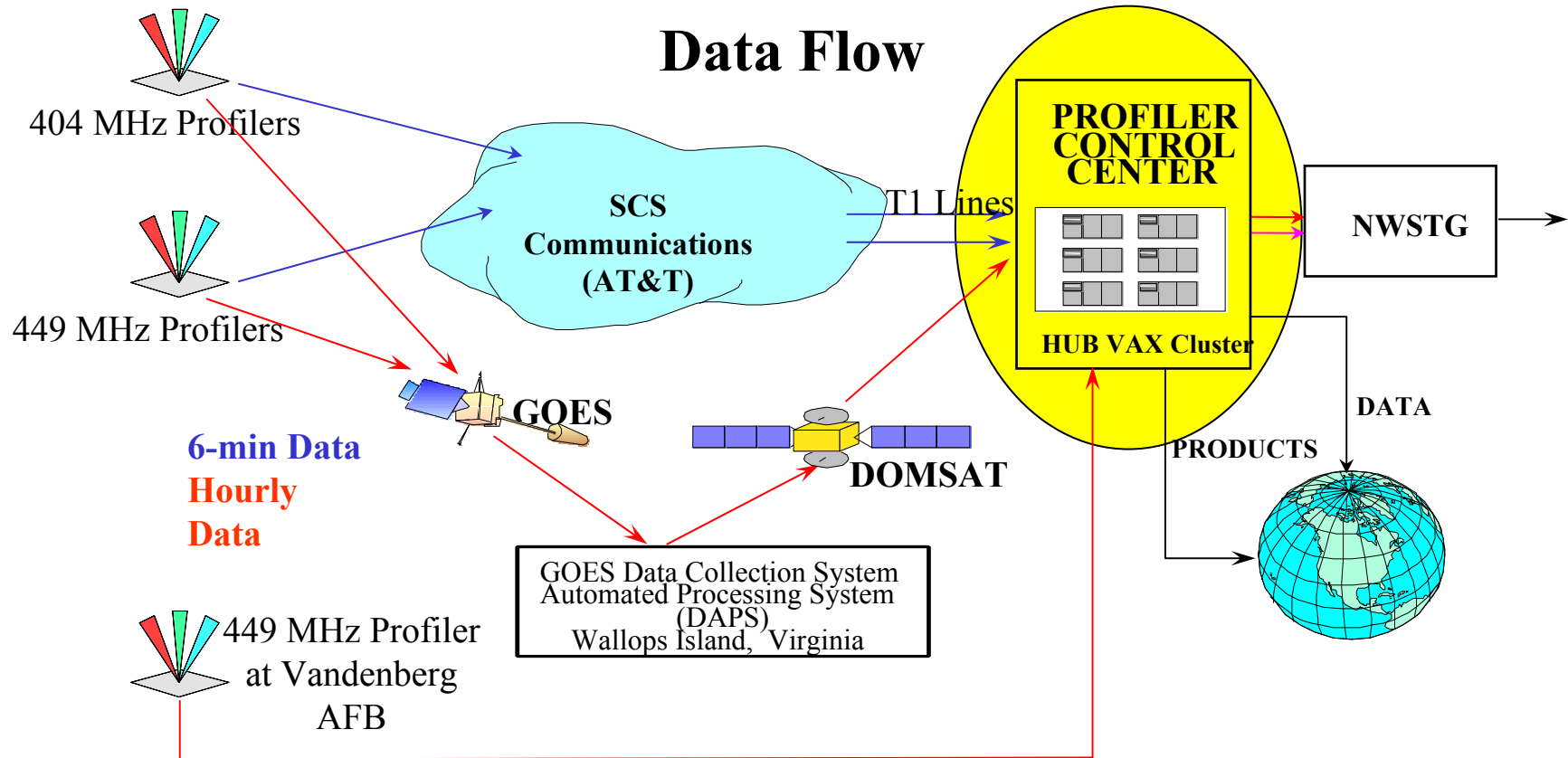
Completed multi-year upgrade of all 404 transmitters

Upgraded all Profilers to be Y2K compliant

Designed and deployed remote main power breaker reset equipment at all NPN sites



National Oceanic and Atmospheric Administration NOAA Profiler Network Data Flow



Highlights of Last 3 Years

Processing, Monitoring and Survivability Improvements

Caused **NO** interference to Search/Rescue satellite system

Improved algorithms/procedures for QC of Profiler data

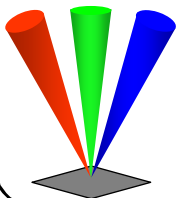
Implemented, with FSL/SDD, automated QC of surface met data

Completed data base for logging/reporting of performance variables

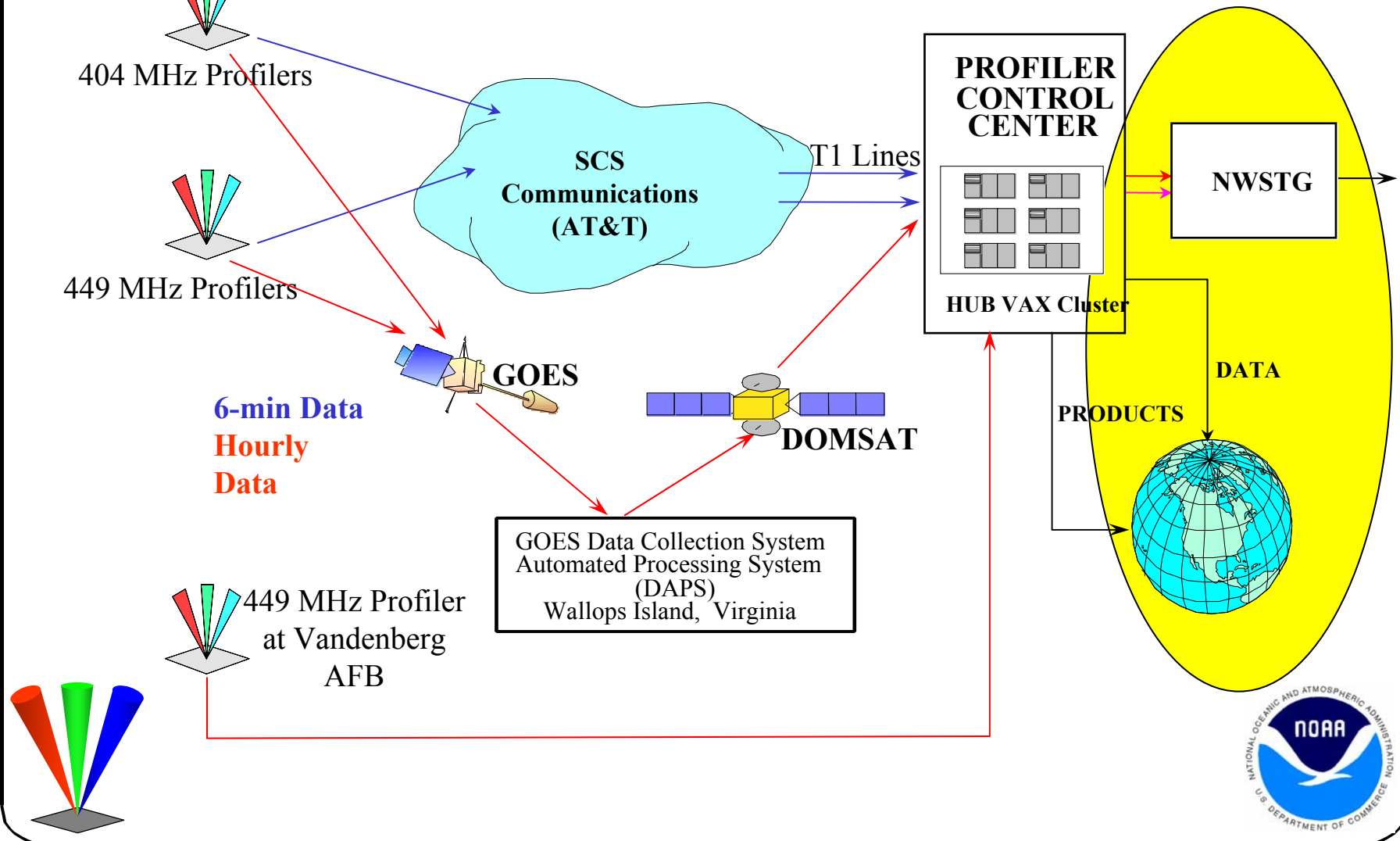
Consolidated repair of key parts to NWS's National Reconditioning Center in Kansas City

Procured key transmitter subcomponents on a "last buy"

Began a program to identify and mitigate system obsolescence



National Oceanic and Atmospheric Administration NOAA Profiler Network Data Flow



Highlights of Last 3 Years

Delivery of Data to Customers

Steadily improved availability of data to customers

Nov'00; 404 profilers = 98.8%; 449 profilers = 99.7%

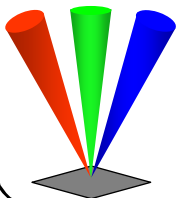
Numerical data now available to public via Division web page

Provided fire weather support during 2000 wildfire outbreaks

Provided special access to data for:

NWS Storm Prediction Center via FSL/FD

NESDIS's Operational Significant Event Imagery
Support Team



DOE/DOD Emergency Response Teams for
Hazardous "Spills"



Highlights of Last 3 Years

Programmatic Achievements

Gained National recognition of NPN importance to weather forecasting

Congressional Hearings

NWS Service Assessment Report, 05/03/99,

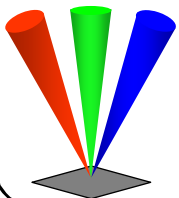
OK/KS Tornadoes: **Recommendation #1**

NPN declared "Mission Critical" and Y2K compliant

Secured 449 MHz **operational** frequency authorization
(No \$'s, but without it we cannot operate)

Annual 404 MHz **experimental** frequency approval now Multi-year

Secured DoC waiver to FTS-2001; no disruption of dedicated data communications service



NOAA PROFILER NETWORK



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NPN Operations, Capability, and Results

Presented by
Douglas W. van de Kamp

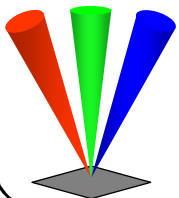
NETWORK OPERATIONS STAFF

Norman Abshire

Michael Bowden

Jeanna Brown

James Budler

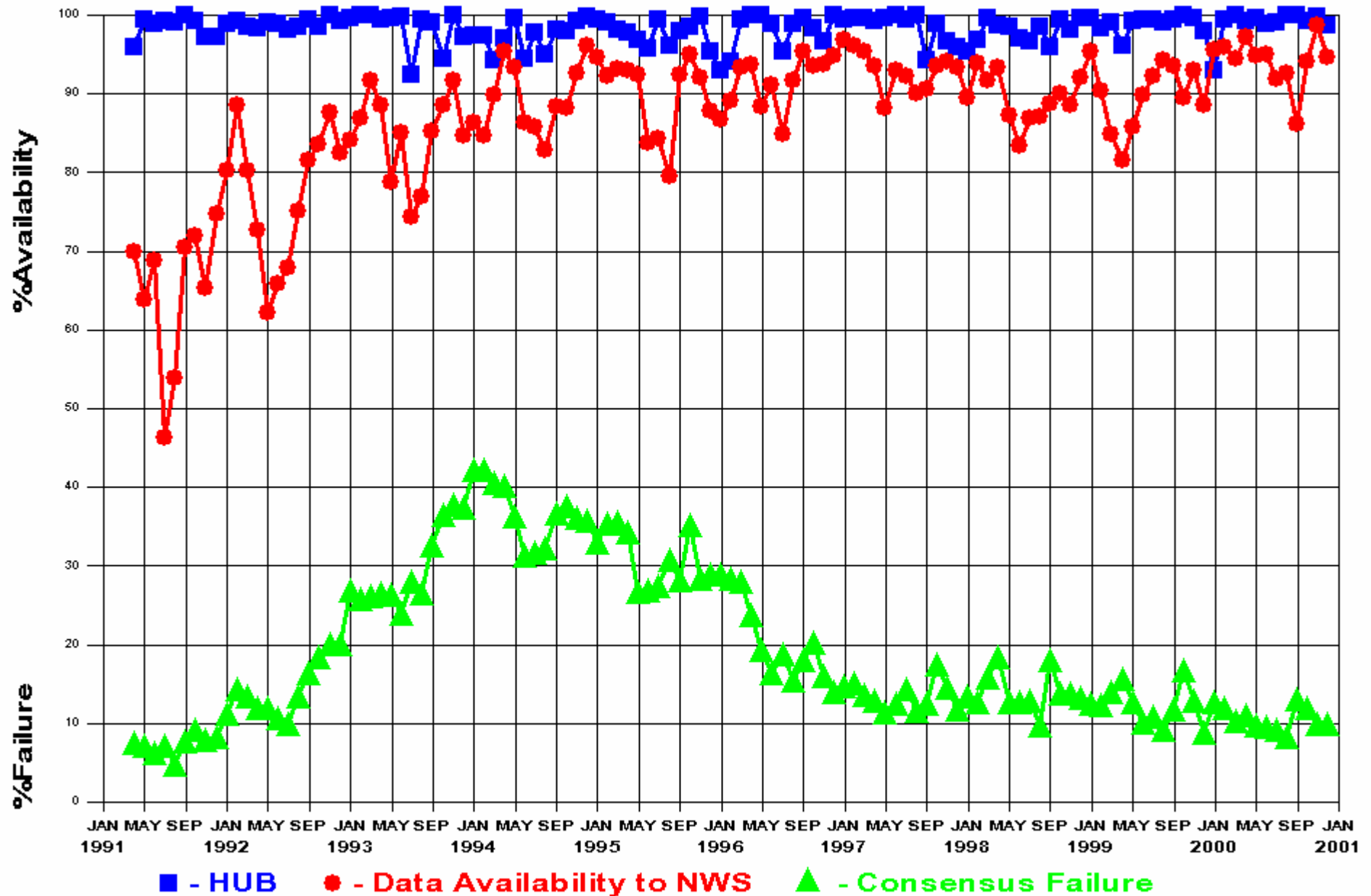


January 30, 2001



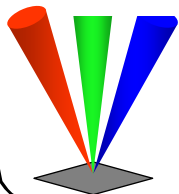
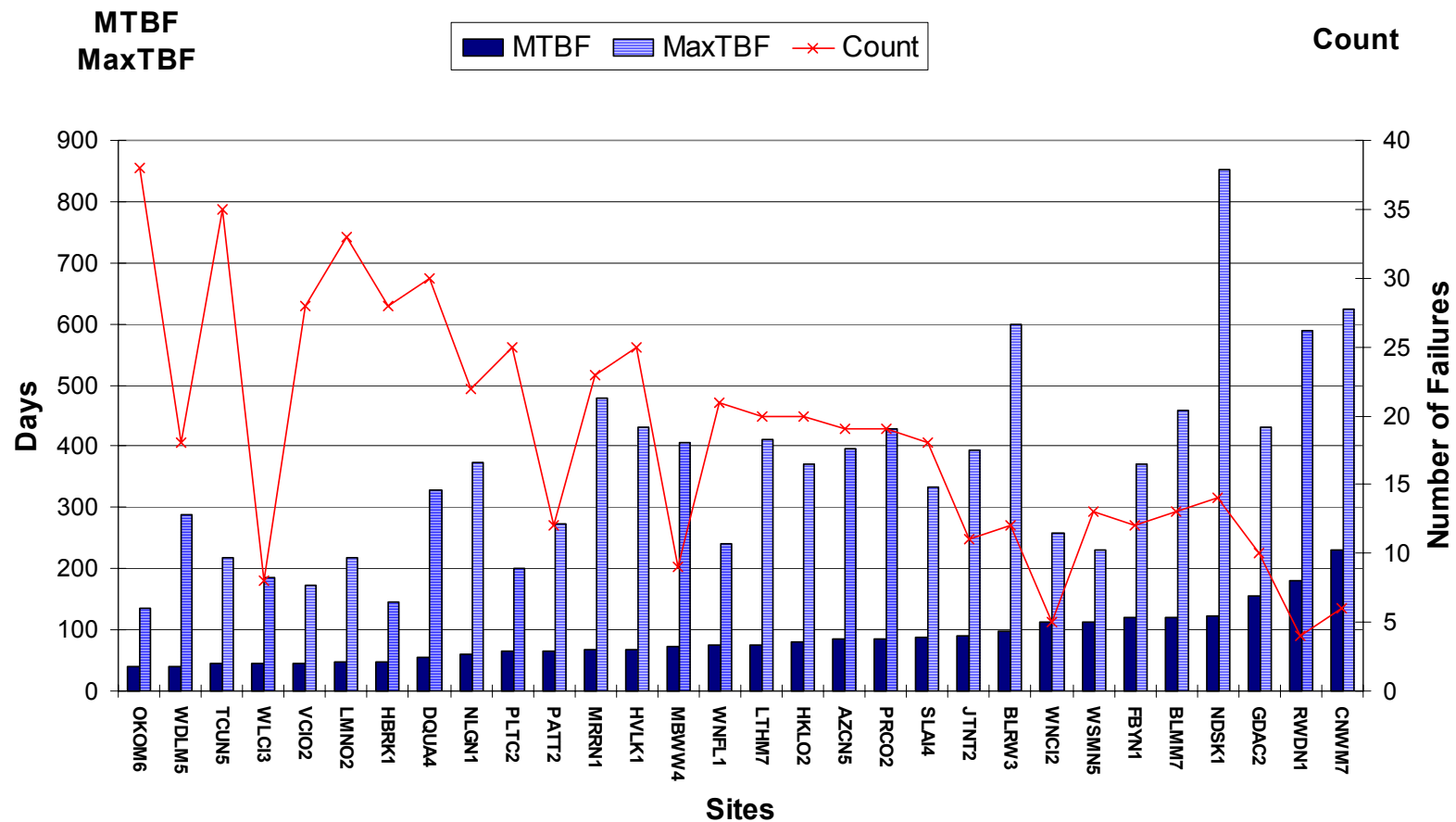
NOAA Profiler Network

404 Profiler Data Availability

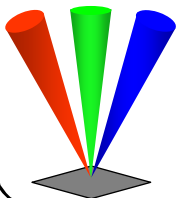
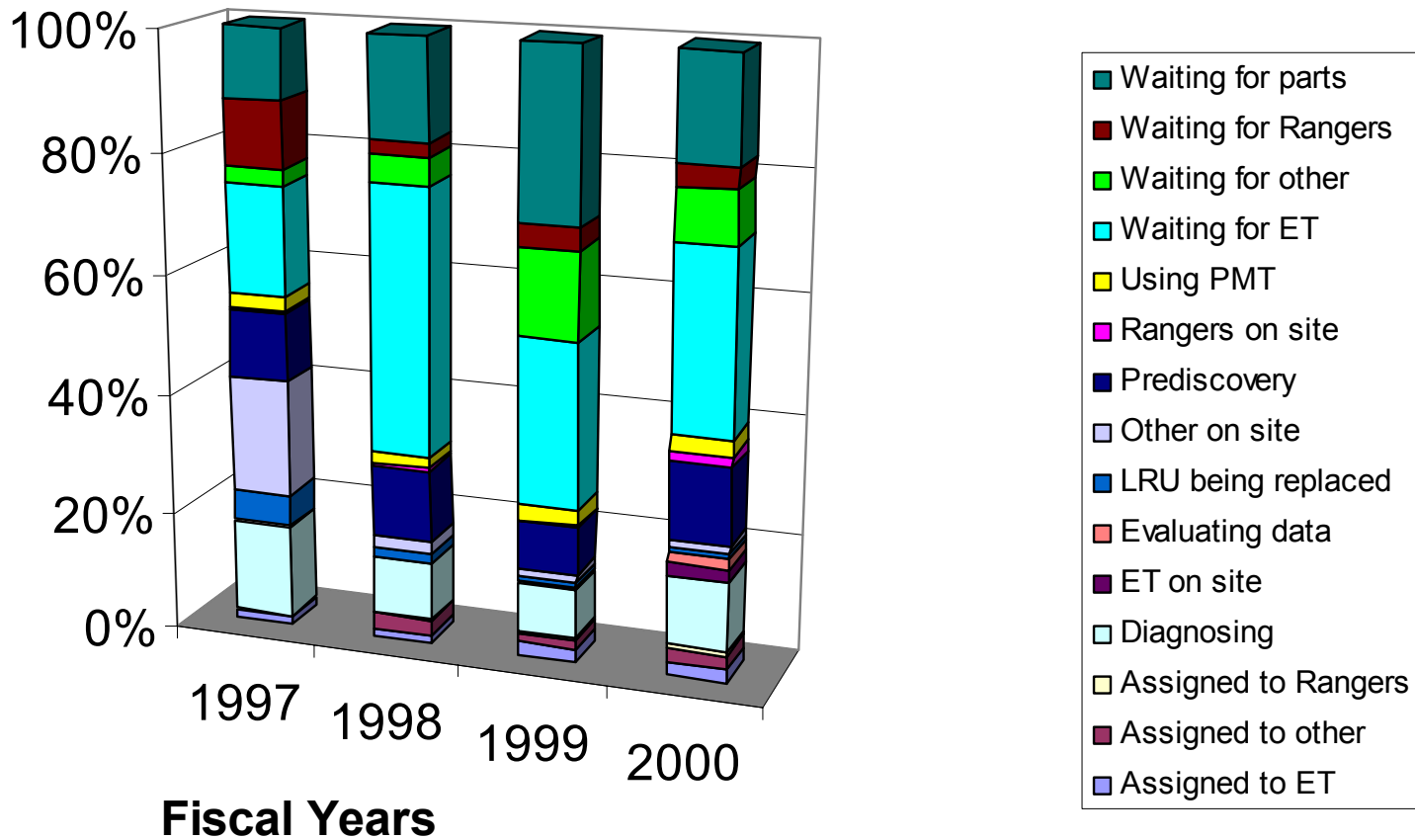


NPN SITE MTBF (Mean Time Between Failure)

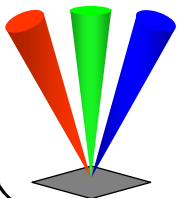
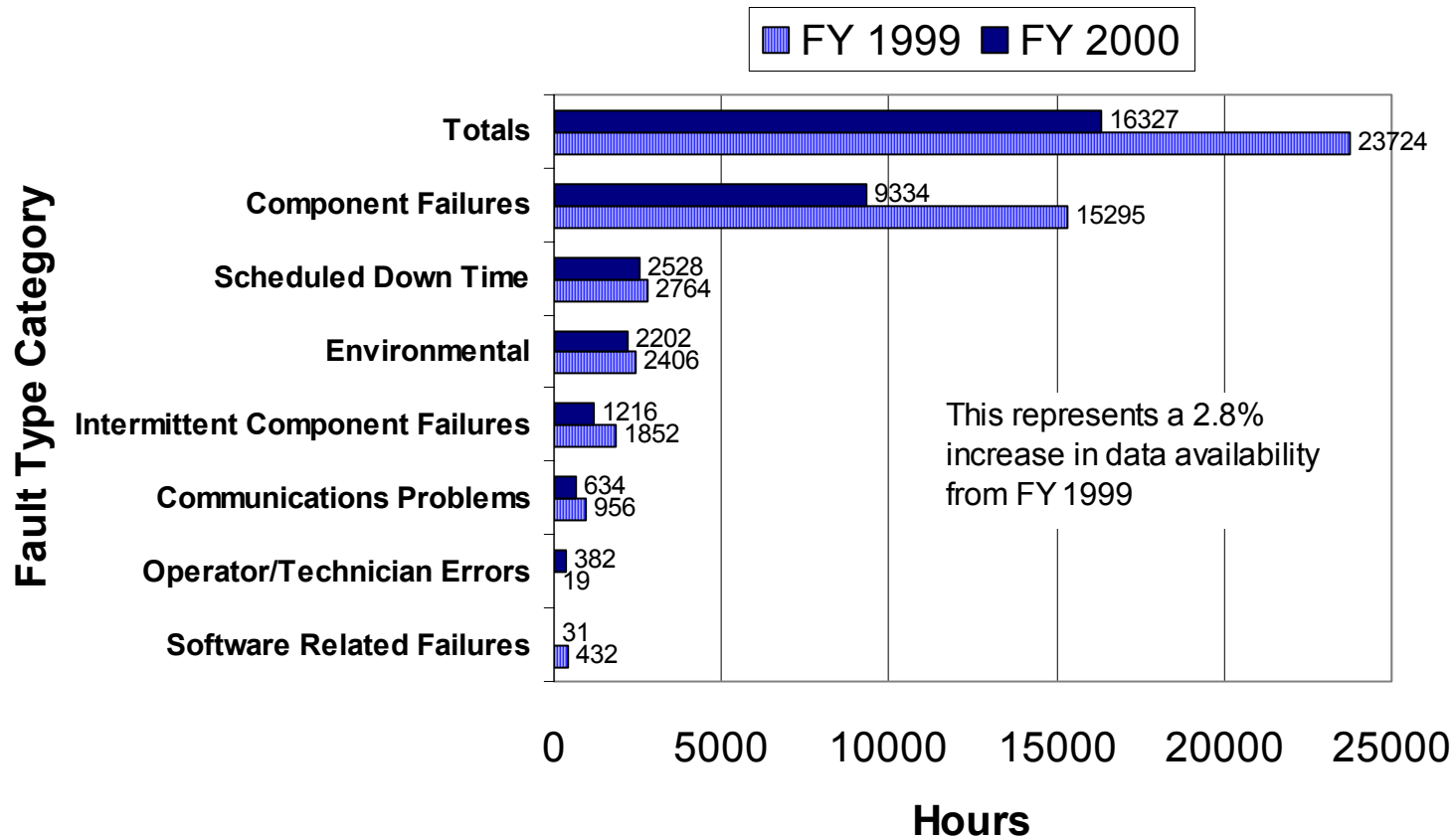
[Based on data outages greater than 24 hours]
Between 1-Jan-1996 and 1-Oct-2000



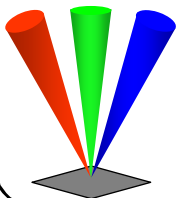
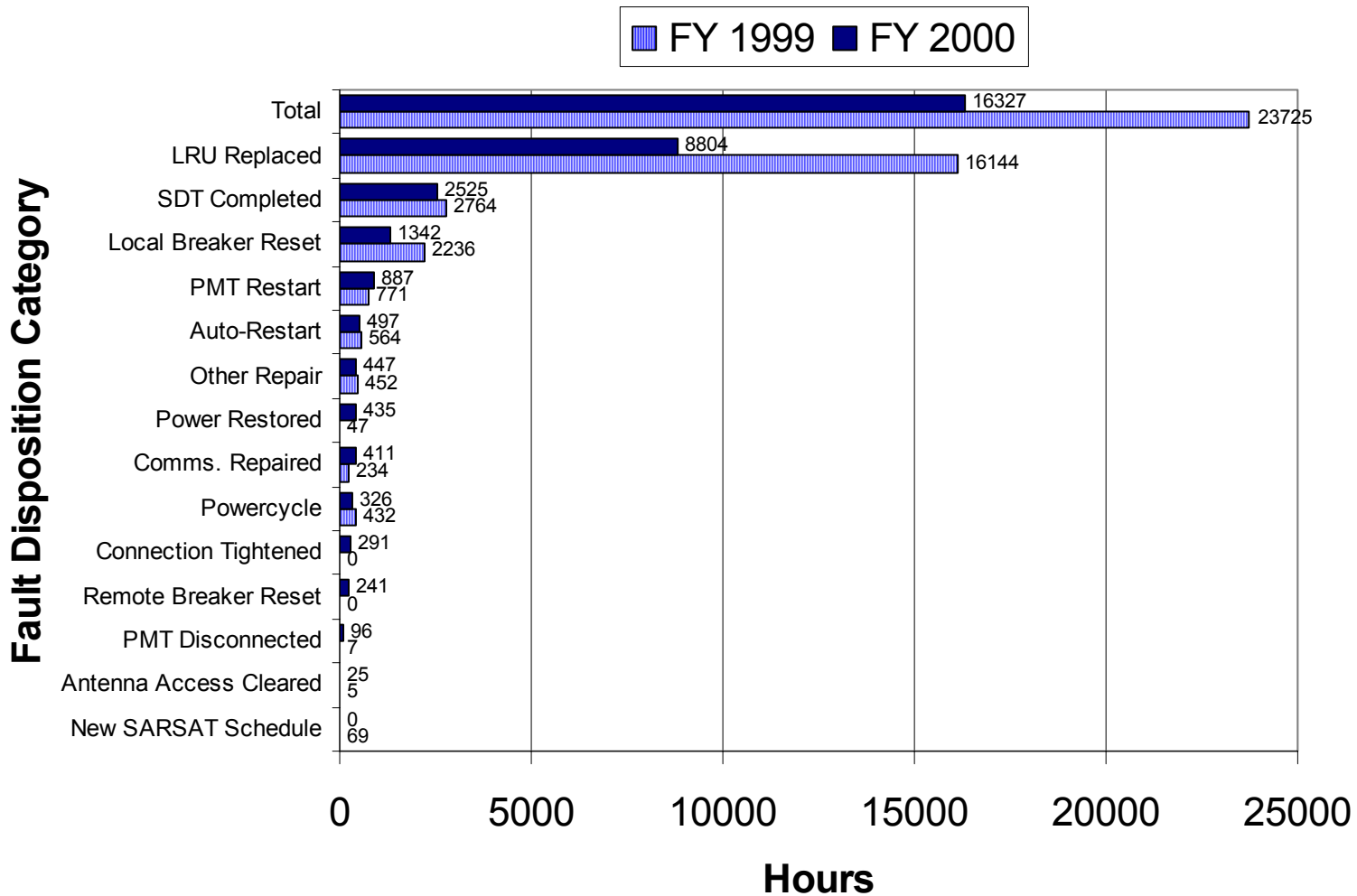
Distribution of Downtime



Hours of Data Lost by Fault Type

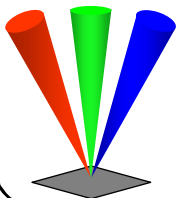


Hours of Data Lost by Fault Disposition



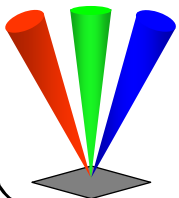
Recent Improvements

- Remote breaker reset capability
- Removal of multiple trip ground clutter
- “In house” QC of surface observations
- Bird contamination check
- NPN monitoring and status info via the web



Contribution of NPN Data to Operational Forecasts and Warnings During May 3, 1999 Oklahoma Tornado Outbreak

- 60 tornadoes, many F3 or stronger
- 42 fatalities, \$1 billion in damages
- Additional 6 fatalities and \$145 million damage in Kansas
- NWS Service Assessment Report's Recommendation #1 (of 13)



“The NWS should make a decision on how to support the existing profiler network so that the current data suite becomes a reliable, operational data source.”



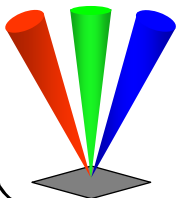
From Dr. Morris Weisman's* testimony before the House Subcommittee on Basic Research, Committee on Science, June 16, 1999.

"... in order to anticipate the potential severity of the events on 3 May, a forecaster had to... carefully monitor the evolving vertical profiles of winds over the region of concern. This can be accomplished to some degree by monitoring the wind profiles at the widely scattered NWS radiosonde sites..., by monitoring the evolving wind field at relatively coarse resolution using operational forecast models,... or by monitoring the evolving winds at much better time and space resolution using (data from the NOAA Profiler Network)."

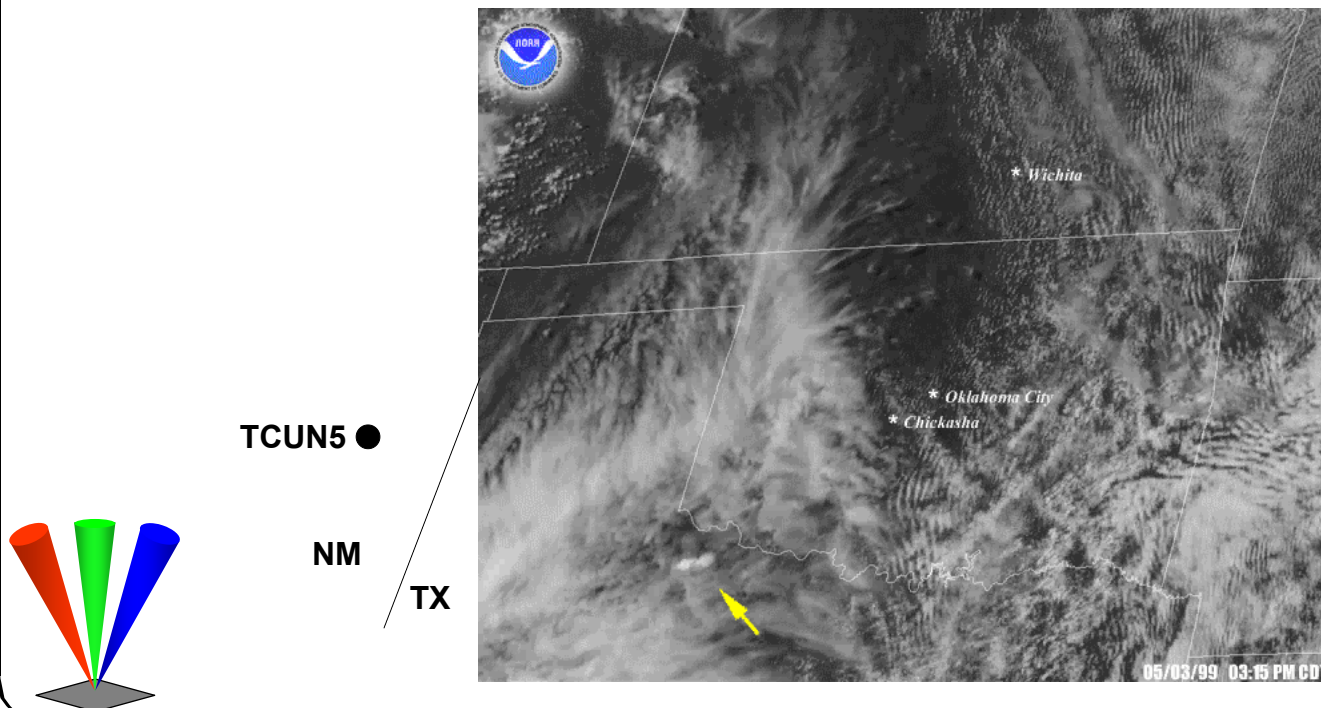
"This profiler network was especially critical on 3 May for monitoring the progression of a jet stream feature which alerted forecasters to the increasing potential for very severe storms that afternoon. Such an evolution was not anticipated using the more standard observing and modeling systems."

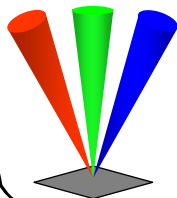
"What this network offers us is unprecedented observations of the wind structure in the atmosphere in time and space scales that we could never see before. No other observing system picked up on this feature with such accuracy in timing."

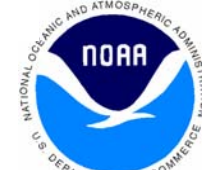
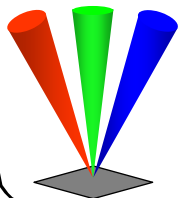
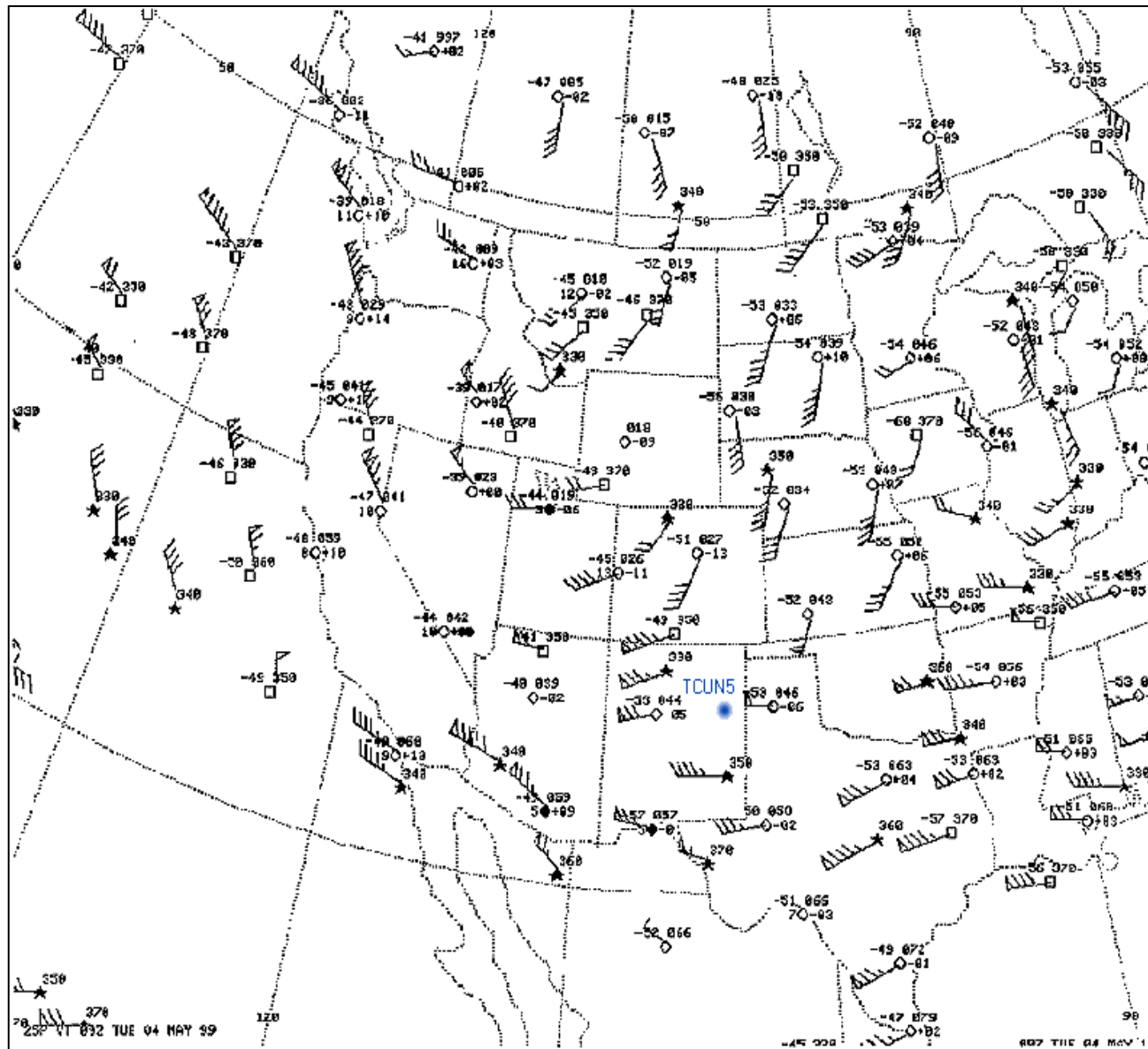
*Dr. Weisman is a scientist with the National Center for Atmospheric Research in Boulder, CO.



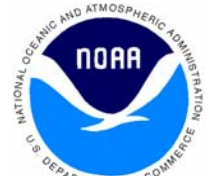
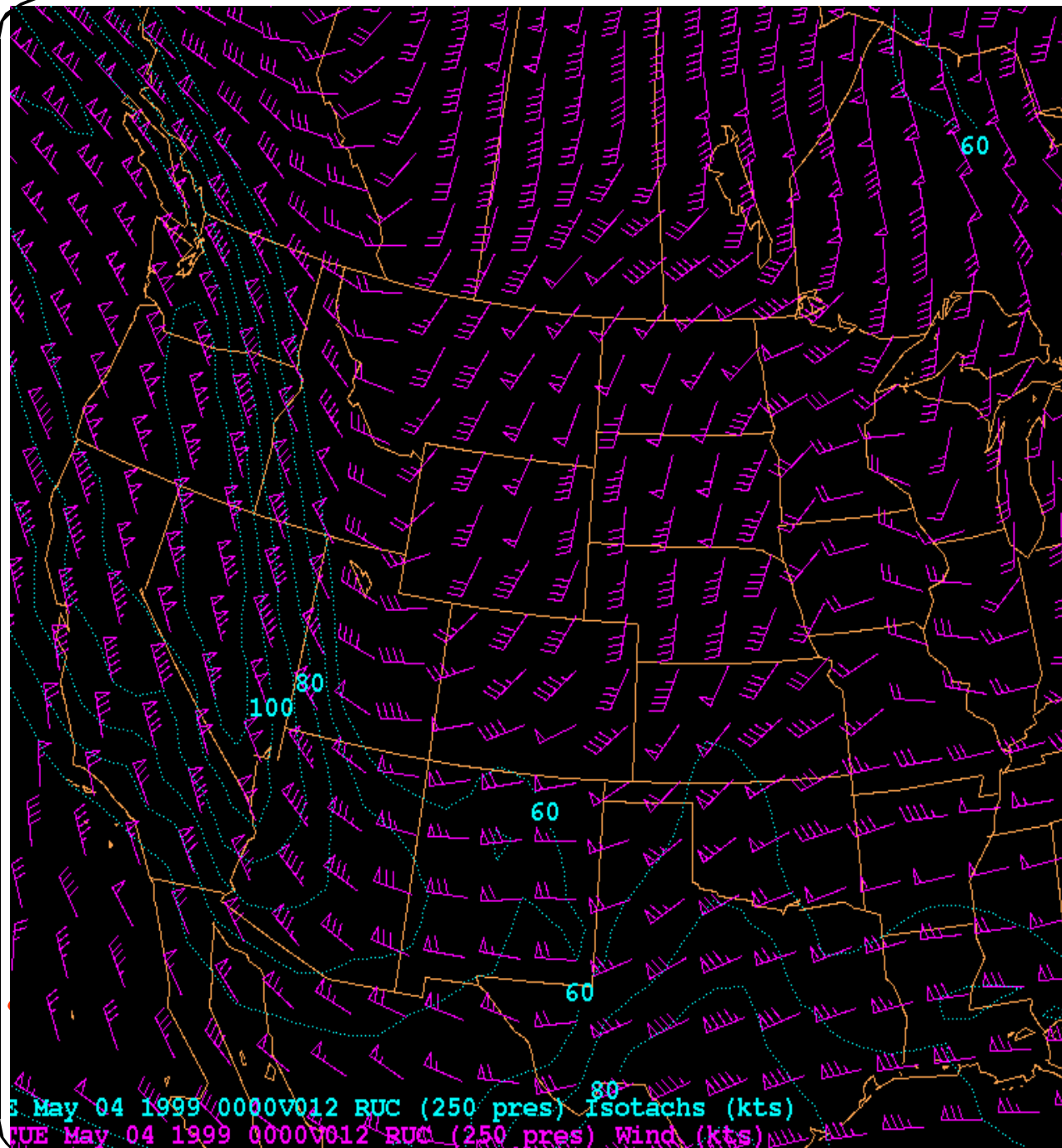
- NPN data unavailable to RUC-2 model, but data **were** available to field forecasters.
- NWP models (RUC, ETA, NGM, and AVN) under-forecast the strength of the jet streak.
- Forecasters observed the jet streak with NPN data and closely monitored its evolution, resulting in improved severe weather watch and warning lead times.



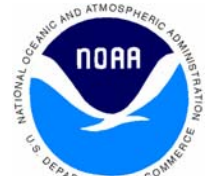




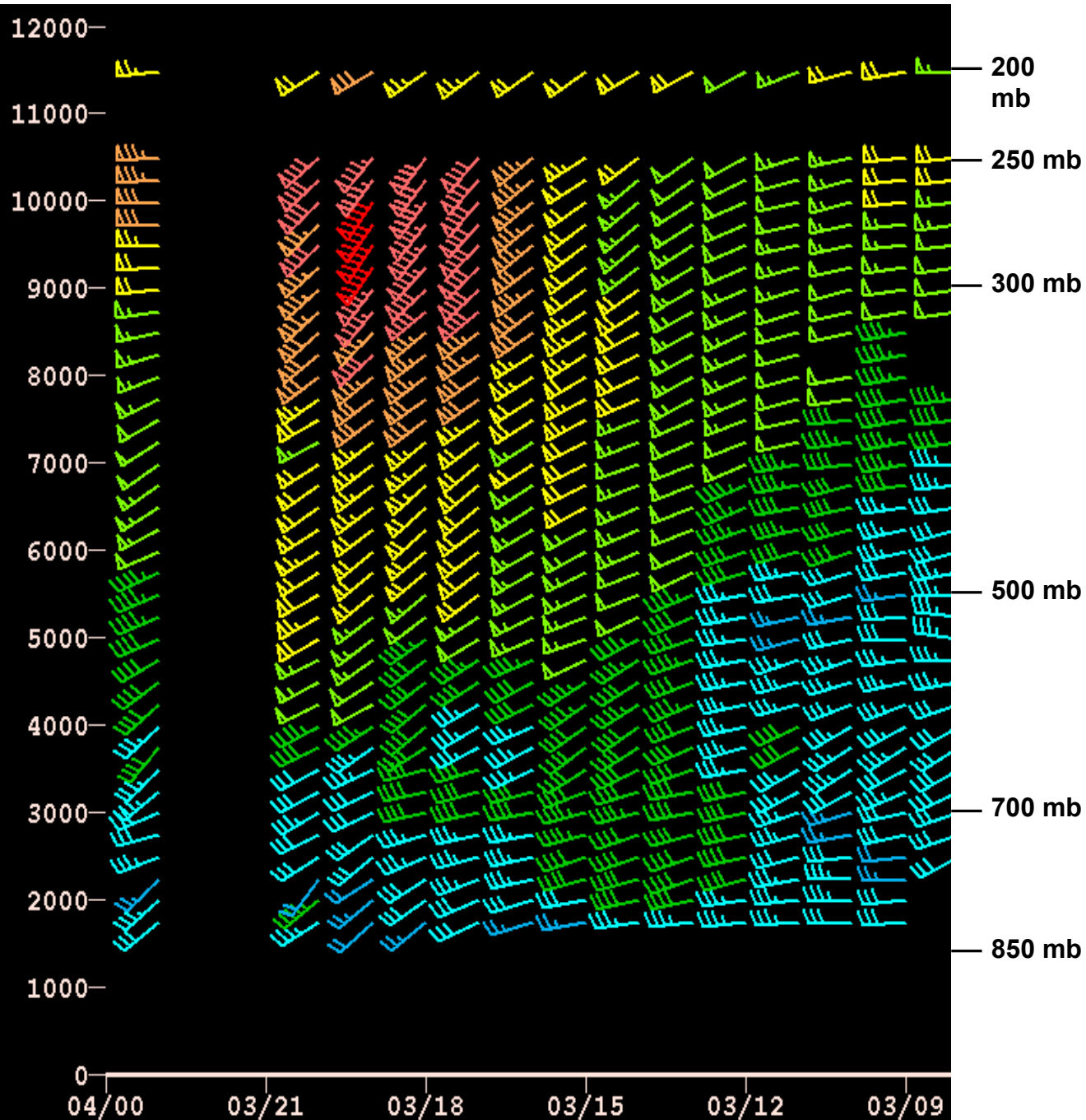
**250 mb
RUC-2 Model
12-h Forecast
Valid 0000 UTC
May 4, 1999**



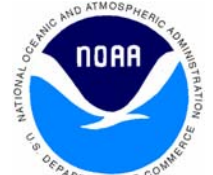
**300 mb
Eta Model
6-h Forecast
Valid 1800 UTC
May 3, 1999**



990503/1800V006 ETA 300 MB ISO(KT>50)
990503/1800V006 ETA 300 MB HGT(X10M)
990503/1800V006 ETA 300 MB TMP(C)



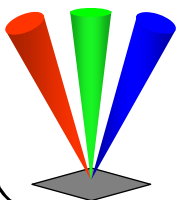
**Tucumcari, NM
(TCUN5)
Time Height
Cross-Section
Ending 0000 UTC
May 4, 1999**



Comments from Forecasters on the Contribution of NPN Data to Operational Forecasting

"During most severe weather events over the central U.S., the WPN provides indispensable and timely information on wind shear and jet characteristics. WPN data is far more accurate, reliable, and detailed than wind data provided from the WSR-88D VWP, RAOBS, or ACARS. SPC forecasters use these data sources daily and I would consider WPN data to be a critical component in accurate SPC forecasts. I can think of no better example of the importance of the WPN than the recent May 3rd tornado outbreak over Oklahoma and Kansas. The data from the Tucumcari, NM profiler (among others) was outstanding and clearly showed upper level winds increasing in speed and descending in height as the day progressed. The profiler data was critical to several decisions made that day and resulted in not only a strongly worded DAY 1 Moderate Risk, but the later upgrade to High Risk." **Greg Carbin, SPC, Norman, OK**

"... the computer models failed miserably with this event and it was the observational data from the profilers that tipped the scales toward a successful forecast. What had begun as a fairly low risk for severe storms suddenly escalated to an extremely dangerous situation. Fortunately, staff at the Storm Prediction Center, WFO Norman, Oklahoma and forecasters for VORTEX99 had used the profiler data early in the analysis cycle and realized the gravity of the situation. If they had trusted model forecasts they would have badly under-forecast a major tornado outbreak with possibly much greater loss of life.



Only the profiler network allowed proper diagnosis of the gravity of the situation." **Jim Johnson, FIC, WFO Dodge City, KS**



Bird Contamination Check

- The time of year is appropriate for bird migration

Current

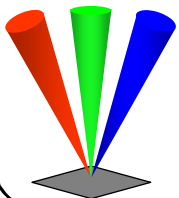
- Spring: 15 February - **15 June**
- Fall: **10 August** - 30 November

Originally

- Spring: 15 February - 15 May
- Fall: 15 August - 30 November

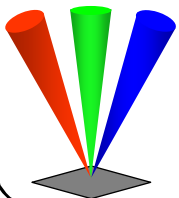
- The time of day, night, is appropriate
 - Spring: 0200-1200 UTC
 - Fall: 0000-1300 UTC

- The height is appropriate (<4500 m MSL).



Bird Contamination Check

- The wind direction is favorable for migration
 - Spring: $90^{\circ} - 270^{\circ}$
 - Fall: $270^{\circ} - 360^{\circ}$ or $0^{\circ} - 90^{\circ}$
- The velocity variance signature is appropriate
 - Average of the north, east **and vertical** beams $>1.7\text{m}^2\text{s}^{-2}$
- The increased velocity variance is not a result of precipitation
 - magnitude of downward vertical velocity $<0.8\text{m s}^{-1}$
(originally was $<1.5\text{m s}^{-1}$)



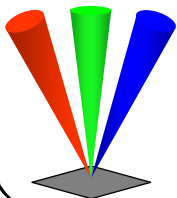
Observational Input Data Inventory For RUC2 At NCEP

Note: "-" means that no data was available

Explanation Of Observation Count Information

Number Of Observations

YR	DAY	HR	RAOBs	Surface	Buoys	Profilers	VADs	ACARS	GOES_CDW
1	005	21	2	2518	83	28	247	3270	4230
1	005	20	1	2495	85	28	246	3206	4052
1	005	19	2	2510	87	27	247	3257	4050
1	005	18	0	2558	112	29	232	2860	3888
1	005	17	0	2503	86	29	220	3727	4484
1	005	16	0	2083	55	14	219	2915	4216
1	005	15	0	2468	89	31	208	3454	4500
1	005	14	3	2554	86	29	219	3564	4086
1	005	13	88	2496	86	31	226	2595	3411
1	005	12B	84	2550	145	31	378	3869	4026
1	005	12	29	2216	105	31	226	2496	3875
1	005	11	0	2309	92	30	227	4122	4697
1	005	10	0	2240	85	30	225	4031	4387
1	005	09	0	2245	90	30	229	2516	3388
1	005	08	0	2258	85	29	228	1451	2432
1	005	07	2	316	0	0	113	1662	1893
1	005	06	0	181	0	0	108	2369	2505
1	005	05	0	200	0	0	224	3958	3986
1	005	04	0	0	0	0	0	773	750
1	005	03	4	2255	85	30	228	3977	4718
1	005	02	6	2281	86	30	222	3602	4349
1	005	01	90	2324	85	30	208	3989	4632
1	005	00B	91	2491	143	30	308	6080	5260
1	005	00	36	2279	105	30	200	4314	5123
1	004	23	0	2397	85	31	220	4551	5158



Fri, 5 Jan 2001 21:50:06 U

	05-JAN-2001		04-JAN-2001		03-JAN-2001		02-JAN-2001		01-JAN-2001		31-DEC-2000
23z	12z	0z	12z	0z	12z	0z	12z	0z	12z	0z	12z

[illegible]

CENA2	+++ :++++ +++++:+++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++
GNA A2	+++ :++++ +++++:+++ <u>D</u> +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++
TLKA2	+++ :++++ +++++:++++ +++++:++++ +++++:++++ <u>DDDDDDD</u> ++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++ +++++:++++

SYCN6
VBGC1

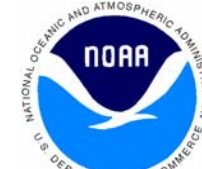
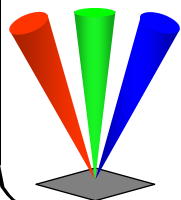
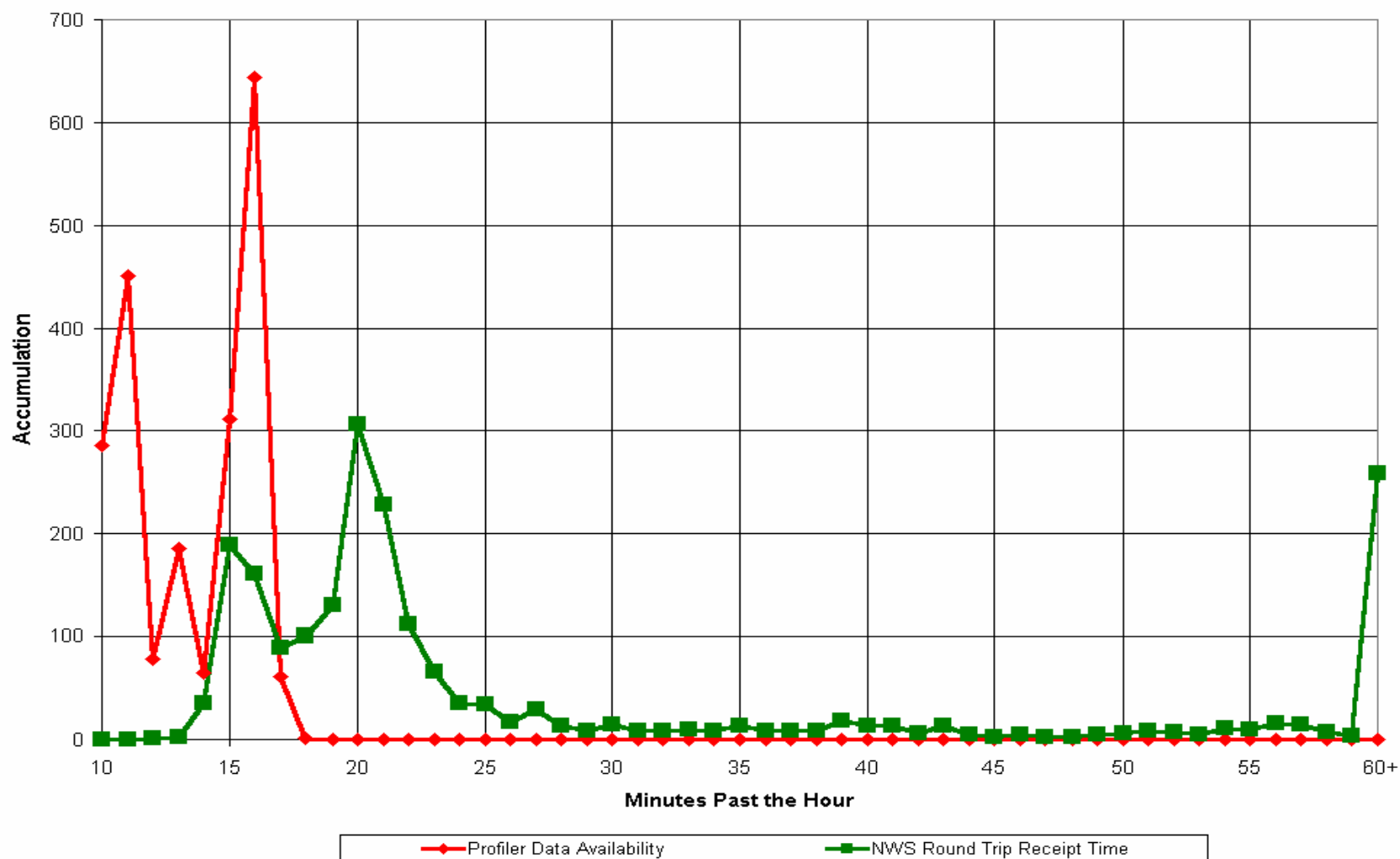
+++++D+++ | ++++D+: +++++ | +++++; +++++ | +++++: D++++ | +++++; +++++ | +++++; +++++ | +D+++ : +++++ | +++++D++++ | +++++; +++++ | +++++; +++++D | +++++D++++ | +D+++;

(0-9 = Minute 10 through 19; A-P = Minute 20 through 35; * = After minute 35 or never)

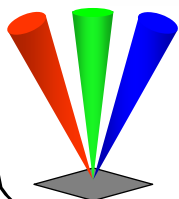
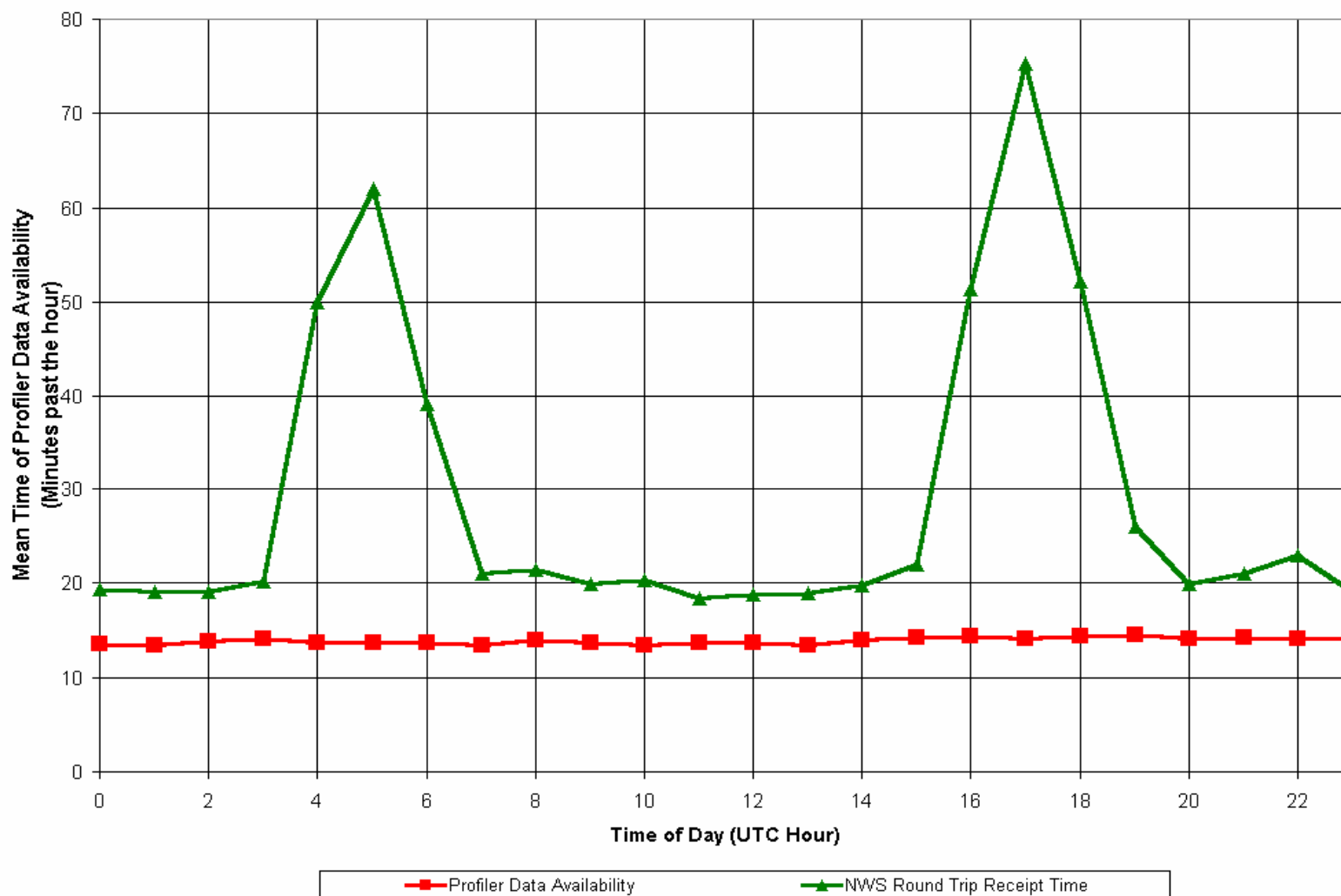
VERIF 94AAAA594685AAAA*5779AAAA*J6575455A47JJJA448459A9JJJ7544C7545IJJ45837A4ABJJJB889899A7FJJ977B878AAJJJ997B9A989JJJA87A99888JJJA8899B788JJ
RTRIP 94C***594685B***5779ACABB**6575455A47J**A448459A9***7544C7545T**45837A4AB***B889899A7F**977B878AA***997B9A989***A87A99888***A8899B788L*

23z	12z	0z	12z	0z	12z	0z	12z	0z	12z	0z	12z
	05-JAN-2001		04-JAN-2001		03-JAN-2001		02-JAN-2001		01-JAN-2001		31-DEC-2000

Hourly Profiler Data Availability (Oct 17 2000 to Jan 19 2001)

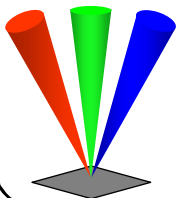


Hourly Profiler Data Availability as a Function of Time of Day (Oct 17 2000 to Jan 19 2001)



Future Works

- Acquire raw spectra
- Improve data quality
 - bird rejection
 - ground clutter
 - internal interference
- Validate 20' Sfx Met Tower
- Acquire more BLP data
- Improve RASS QC
- Monitor NWS forecast discussions for use of profiler data



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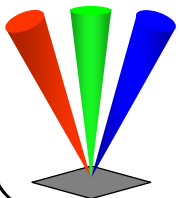
Software Development and Web Services

Presented by
Alan E. Pihlak

SOFTWARE DEVELOPMENT & WEB STAFF

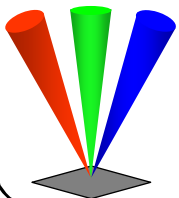
Leon Benjamin
Scott Stierle

January 30, 2001



Goals

- **Software enabling transfer of profilers to NWS operations**
- **Create and maintain dynamic internet presence**
- **Support high data reliability goals of NPN**



Throughout this presentation, text in these colors
will refer to these goals



Goals

- **Software enabling transfer of profilers to NWS operations**

Milestones

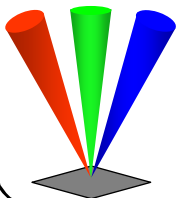
(Where we've been)

1999

- Changed NWS delivery method from X.25 to FTP
- NPN Requirements evolving from assessment to operations
- Rational Rose ties requirements to software development

2000

- NWS Monitoring Project completed
- Software development planning completed
- Base level Java classes defined and tested
- Operations documented as Use Cases in Rational Rose



Goals

- **Create and maintain dynamic internet presence**

Milestones

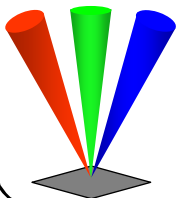
(Where we've been)

1999

- Web pages revamped
- Graphics applets added - Plan view, Skew-T
- Site awarded "most improved" by W4G

2000

- Averaging approximately 18000 web 'hits' per month, 30% from .com and .net addresses.
- First public access to raw profiler data via WWW
- Applets converted to servlets



Goals

- **Support high data reliability goals of NPN**

Milestones

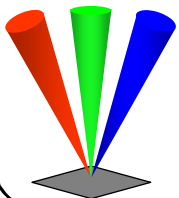
(Where we've been)

1999

- Changed NWS delivery method increased reliability from 88.4% to 90% (*14% of possible*)
- Y2K “Mission Critical” formal test
- DSRC Move supported by parallel HUB

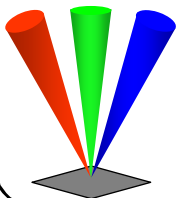
2000

- Parallel HUB increases reliability from 98.8% to 99.3% (*42% of possible!*)
- Y2K Itself - formal reporting - transition team



Future Plans

- **Software enabling transfer of profilers to NWS operations**
- **Create and maintain dynamic internet presence**



Customers

Direct data acquisition

GOV

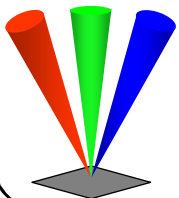
- National Weather Service
- National Climatic Data Center
- National Centers for Environmental Prediction
- DOE and DOD:
 - Defense Threat Reduction Agency
 - Atmospheric Response Advisory Capability

EDU

- UCAR/Unidata
 - NCAR
- University of Wisconsin

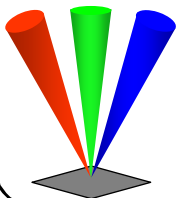
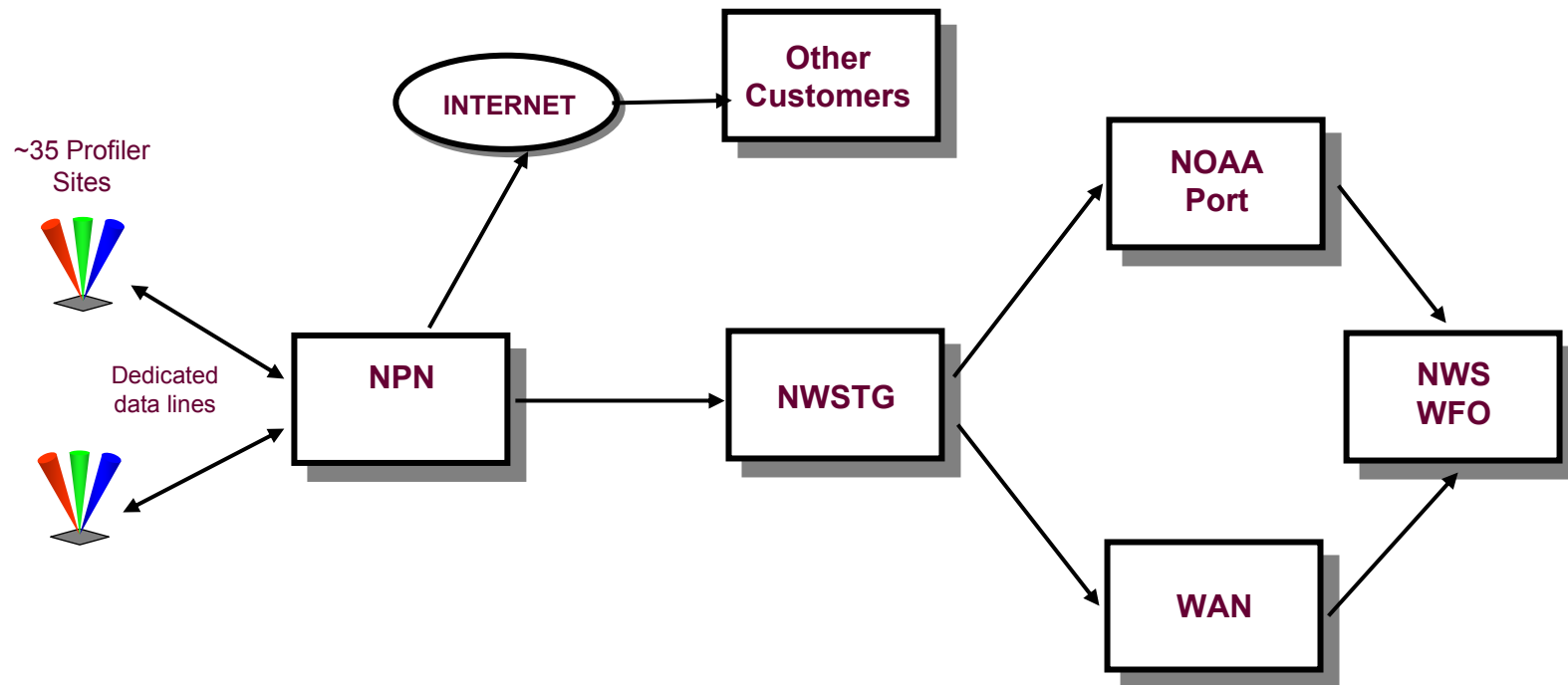
Other

- UK Met Office
- Meteo-France
- Aviation
- General WWW users
 - hot-air balloonists
 - ultralight pilots
 - wind surfers
 - ornithologists
 - others



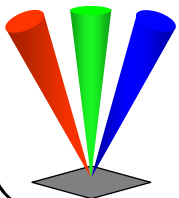
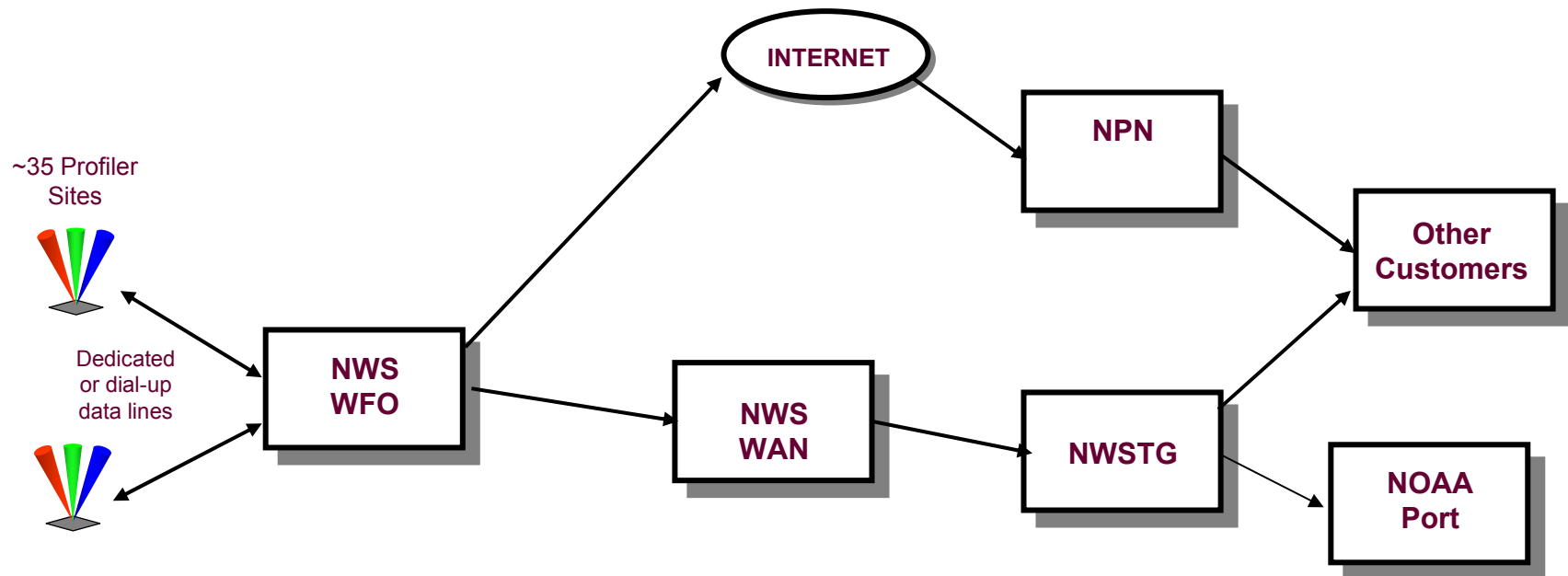
Enable NWS Operations

Current data flow



Enable NWS Operations

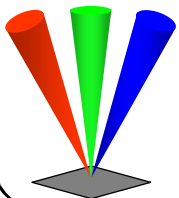
Future data flow



Enable NWS Operations

Objectives

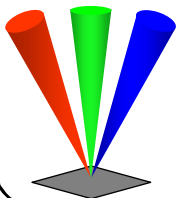
- Reliability equal to that of the HUB (98.8%)
- Phased transition, no interruption of data
- Improved data delivery - no waiting for other profilers to report before delivering data
- Data delivered directly to LDAD and AWIPS
- NWS more involved in diagnosing profiler problems
- Remove software dependencies on aging hardware, enabling cost savings on maintenance, allowing upgrades



Enable NWS Operations

Progress

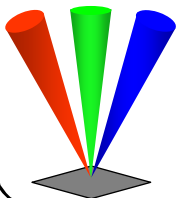
- Java selected as implementation language - “write-once, run anywhere”, among desirable characteristics, allows us to prototype while deferring architectural decisions
- Fundamental business objects in development since 1999 are maturing, accelerating progress of current prototyping
- Parts of the phased transition system in place by June
- New message formats defined and data in these new formats to NWSTG by April



Dynamic Internet Presence

Objectives

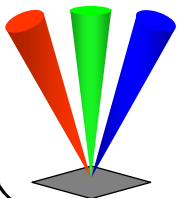
- Upgrade early-90's era WWW server
- Be "The Source" for NPN, BLP profiler data
- Present data in a variety of formats - NetCDF, BUFR, XML, text
- Upgrade pages as needed to maintain dynamic, evolutionary presence
- Provide access to source code developed in DD and encourage open source use



Dynamic Internet Presence

Progress

- Upgraded WWW server running in development environment
- Upgraded pages available for FSL review in March
- Some prototypes running in development environment



Sample of NPN Web Based Remote Maintenance Forum

Provides a common forum that can be used by NWS, Profiler Rangers, and PCC personnel to post messages about remote breaker resets or other maintenance information.

[Post New Message](#) | [Search](#) | [Set Preferences](#) | [Cookie Notice](#) | [Help](#)

NPN Remote Maintenance Forum

Message Index

Welcome back, Scott Stierle!
Since your last visit began, no new messages have been posted!

Messages Posted
Within the Last 5 Week(s)

4 of 7 Messages Displayed
(Reversed Threaded Listing)

[DeQueen - Apparently still no power - 1/1/01 15:30](#) (views: 2)

Doug van de Kamp -- 1/1/01 16:01

[PLTC2 - Attempting power cycle - 12/31/00 06:00 UT](#) (views: 5)

Doug van de Kamp -- 12/31/00 05:57

[Re: PLTC2 - Attempting power cycle - 12/31/00 06:0](#) (views: 3)

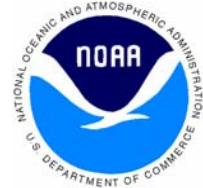
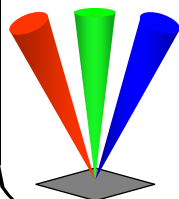
Doug van de Kamp -- 12/31/00 16:00

[Haviland reset](#) (views: 6)

Brian Phillips -- 12/24/00 02:08

[Post New Message](#) | [Search](#) | [Set Preferences](#) | [Cookie Notice](#) | [Help](#)

NPN Remote Maintenance Forum is maintained by [webmaster-dd](#) with [WebBBS 4.33](#).



Prototype Web Based Real-Time Profiler Status Page



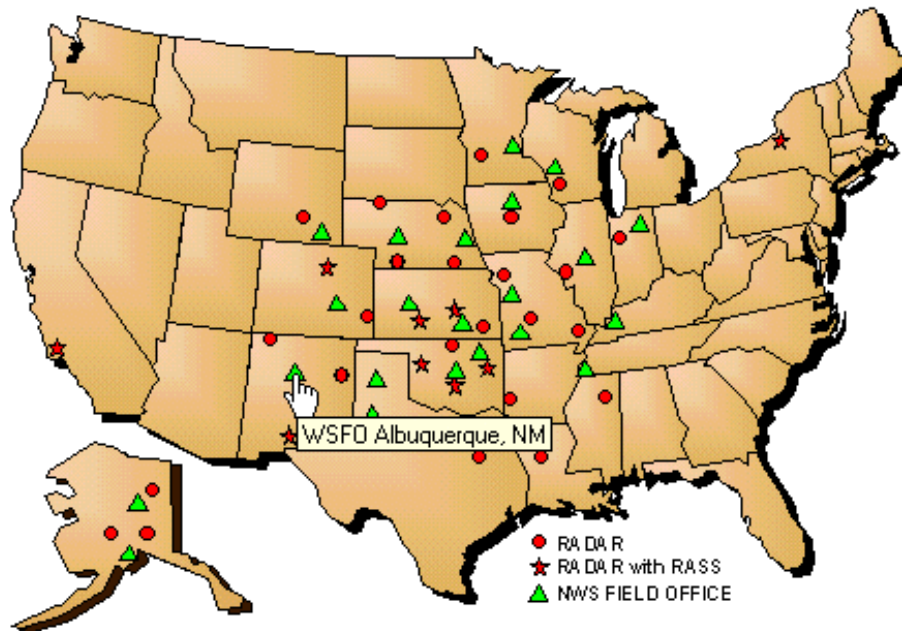
NOAA Forecast Systems Laboratory
Demonstration Division

NOAA Profiler Network Status

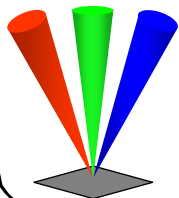
[Home](#) [News](#) [NPN Profilers](#) [BLP Profilers](#) [GPS Meteorology](#) [FSL](#) [OAR](#) [NOAA](#) [Links](#)

WSFO Locations:

Albuquerque, NM
Amarillo, TX
Anchorage, AK
Chanhassen, MN
Cheyenne, WY
Dodge City, KS
Fairbanks, AK
Ft. Worth, TX
Goodland, KS
Johnston, IA
LaCrosse, WI
Lincoln, IL
Lubbock, TX
Memphis, TN
Norman, OK
North Platte, NE
North Webster, IN
Paducah, KY
Pleasant Hill, MO
Pueblo, CO
Shreveport, LA
Springfield, MO



Profiler Sites are maintained by National Weather Service Field Offices (WSFO) located nearest to profiler sites. Select a Profiler Site or WSFO from the map or select a WSFO from the list to view status information about profilers maintained by that WSFO.



NOAA PROFILER NETWORK



TECHNICAL REVIEW

JANUARY 30, 2001

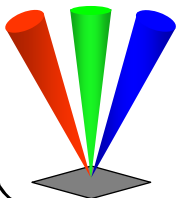
NOAA Profiler Network Technical Review

Facilities and Systems Administration

**Presented by
Bobby R. Kelley**

Facilities and Systems Administration Staff

**Michael Gallegos
Michael Pando**

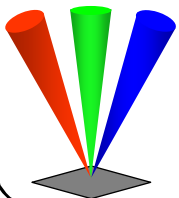


January 30, 2001



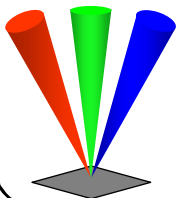
Topics

- Responsibilities
- Move to DSRC
- Recent Improvements
- Plans
- Summary



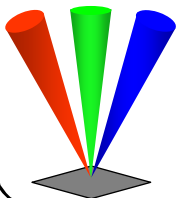
Responsibilities

- **Systems Administration**
 - HUB systems (13 Micro-VAXs in two clusters)
 - One Sun E3000 server
 - Two Sun Ultra 1 workstations
 - Six Sun SPARCstation 5 workstations
 - 11 PCs running Linux
 - One PC server running NT 4
 - 34 PCs running Windows 95/98/NT 4
 - One PC running SCO Unix
- > **Includes:**
 - Adding systems to the network
 - Preventive maintenance
 - System problem isolation & maintenance
 - Peripheral installations & maintenance
 - Computer & network security
 - IT Purchasing
 - Property control
 - Backups



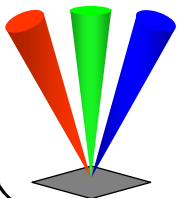
Responsibilities

- **Network Administration**
 - Configuration & testing
 - Adding additional systems
 - Problem isolation & maintenance
- **Telecommunications Administration**
 - NOAA Profiler Network -- 38 data circuits
 - > Migrating from FTS-2000E to AT&T Commercial
 - > Includes link to NWS Gateway
 - Configuration and testing
 - Problem isolation & maintenance or coordination for AT&T repairs



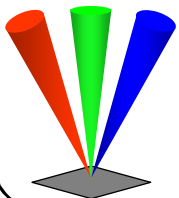
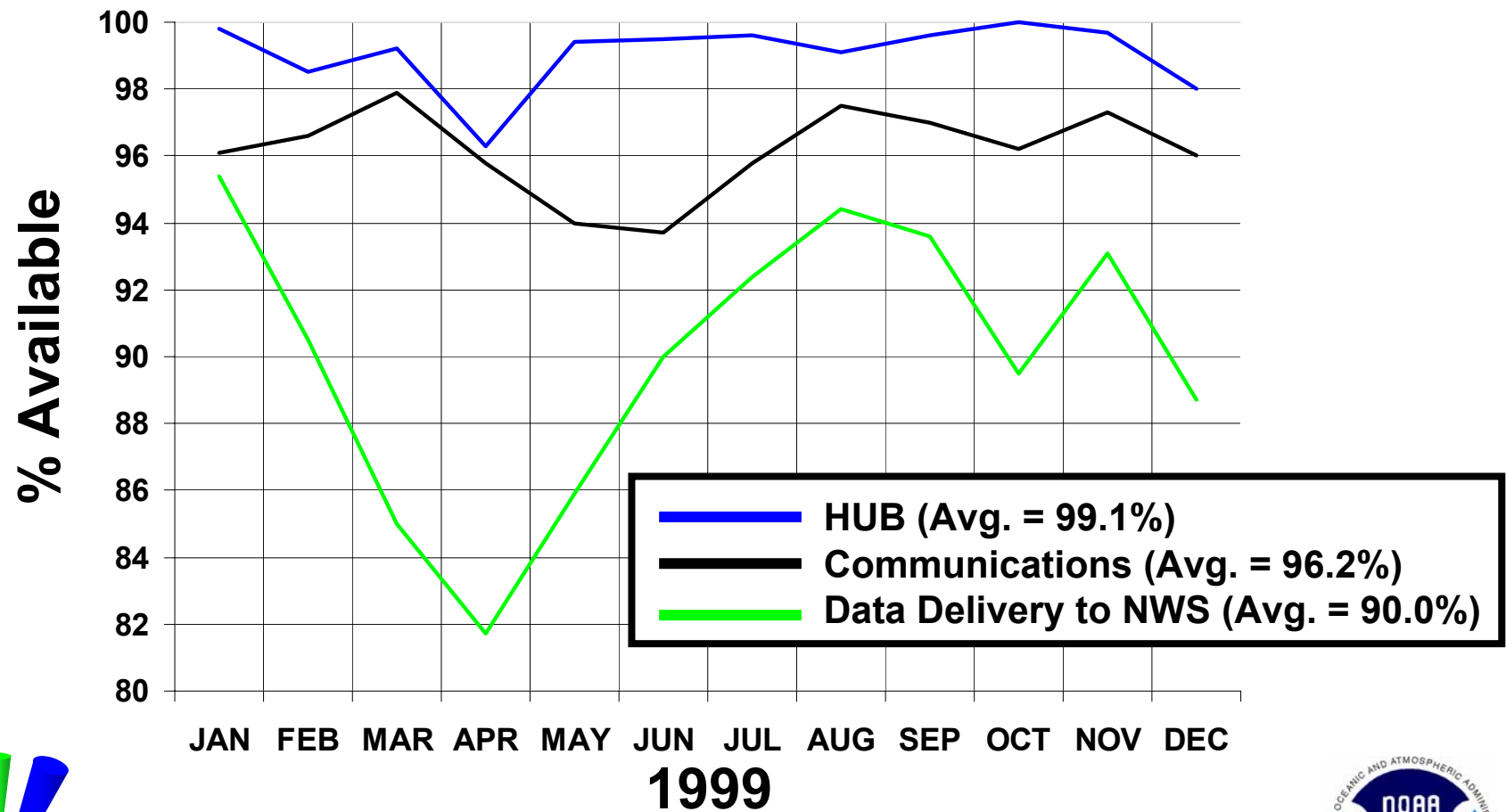
Move to DSRC

- **Completed on April 19, 1999**
- **Well planned**
- **Well executed**
- **Resolved problems encountered**
- **Highly successful**



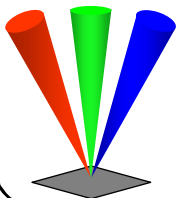
Move to DSRC

Summary of Availability



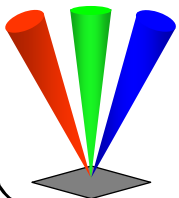
Recent Improvements

- **Eliminated single points of failure**
- **Minimized down time and risks**
- **Used low cost, high performance approach**
- **Minimized telecomms risks and cost**



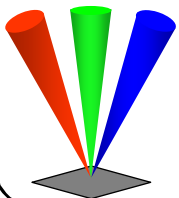
Recent Improvements

- **Eliminated single points of failure**
 - **Secondary HUB employed as hot backup**
 - > Used in case of production system failures
 - > Allows for production system preventive maintenance
 - **Redundant routers in place for link to NWS Gateway**
 - **DSRC comms infrastructure enabled using the Internet as a backup link to deliver profiler data to NWS**
 - **Invested in an uninterruptable power system and connected the computer room to the building emergency generator prior to Y2K**



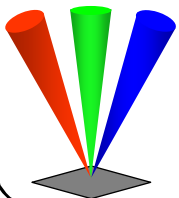
Recent Improvements

- **Minimized down time and risks**
 - **Facilities & Systems Administration on-call 24 x 7**
 - **GSA installed sensors in the computer room and the Profiler Control Center to provide pager alerts when the temperature exceeds limits**
 - **Implemented a web page to monitor DD computer room temperature**
 - > **Facilitates GSA support for DD computer room and adjacent areas of the building**
 - > **Correlation of DD computer room temperature and outside temperature on this web page has provided valuable information for GSA maintenance support**



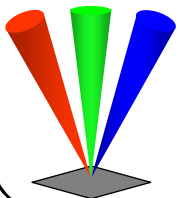
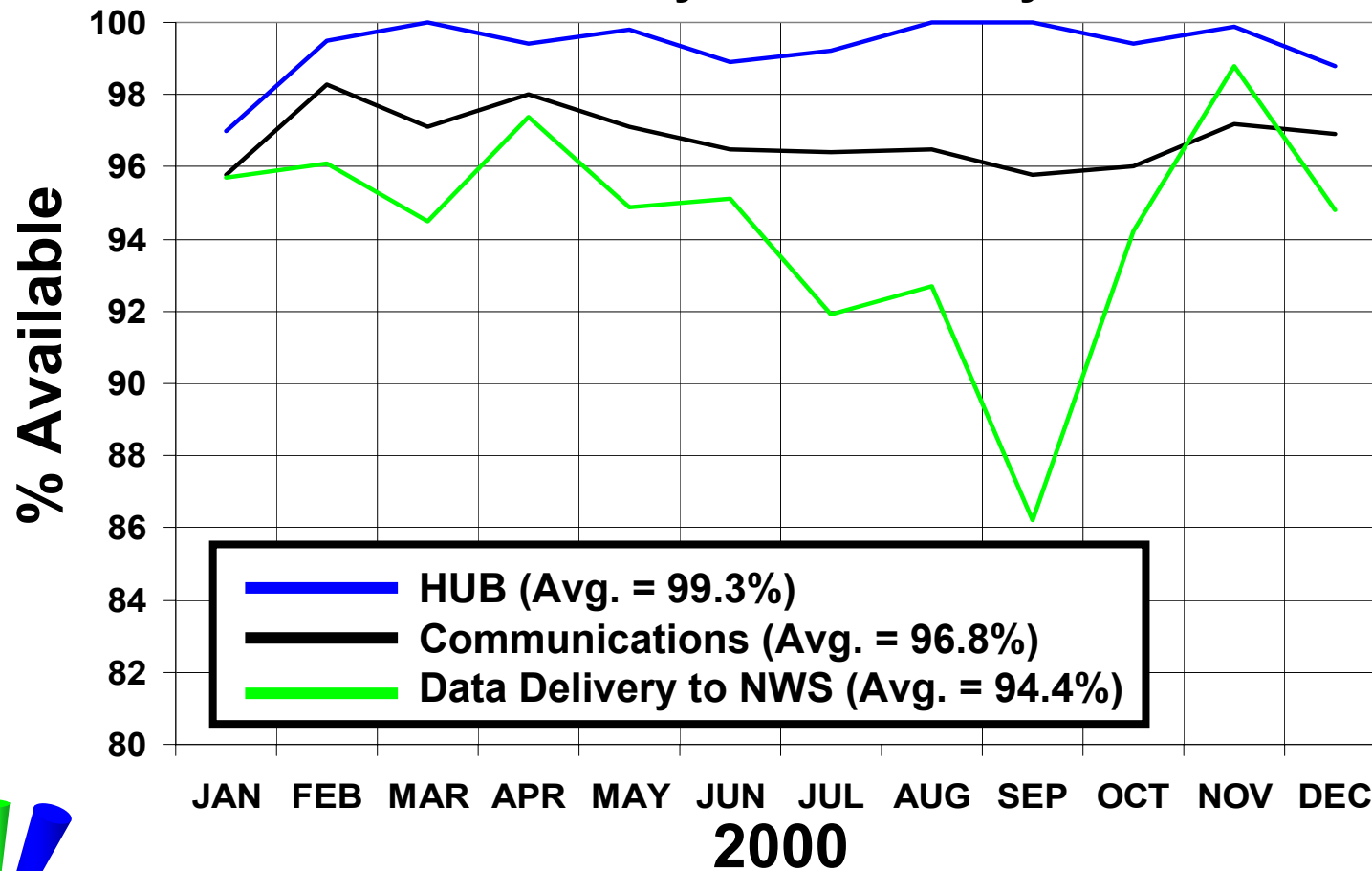
Recent Improvements

- **Minimized down time and risks**
 - **Trained new staff and reemphasized HUB monitoring and preventive maintenance procedures**
 - > **Ensures HUB uptime and data delivery**
 - > **Very few calls from NWS Gateway these days**
 - **Delivery of profiler and GPS-IPWV data to FD is monitored by FD operators**
 - > **Any problems with data delivery to FD often indicate problems with profiler data delivery to NWS**
 - > **Early notice about data delivery problems to FD can minimize profiler data outages for NWS**



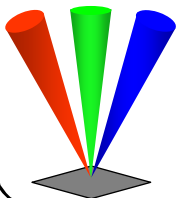
Recent Improvements

Summary of Availability



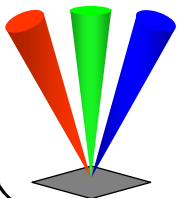
Recent Improvements

- **Used low cost, high performance approach**
 - **Implemented off-the-shelf PCs with Linux to support GPS-IPWV demonstration network processing**
 - > **Processing “array” architecture**
 - > **Supports GPS-IPWV growth at low cost and high performance**
 - **Implemented off-the-shelf PCs with Linux & Windows 98 to support new HUB software development**
 - > **Used PCs received from the Census Bureau**
 - > **Also used excess equipment from FSL and other labs when older equipment was satisfactory**



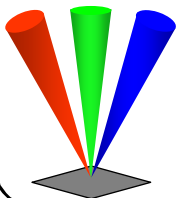
Recent Improvements

- **Minimized telecomms risks and cost**
 - **Obtained the first DOC approval of request for exception to FTS-2001**
 - > Retained AT&T telecommunications services
 - > Retained existing equipment
 - > Ensures continued, reliable NPN comms
 - > Lower cost than FTS-2001
 - Lower administrative effort for DD (indirect cost)
 - Savings of \$750,000 in service cost over five years
 - Preserved \$130,000 in on-hand comms equipment



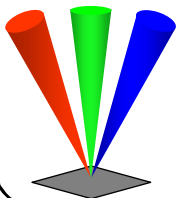
Plans

- **Maintain current operations**
- **Ensure continued timely data delivery to all customers**
- **Upgrade the NPN backup comms hardware and software (DOMSAT Receive Station)**
- **Implement improved system backup hardware and software**
- **Add additional GPS-IPWV processing systems as and when required**



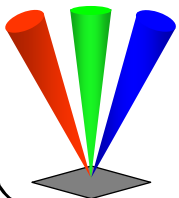
Plans

- Upgrade network infrastructure hardware in line with DSRC network upgrades
- Support new HUB software development and testing
- Prototype & test new HUB hardware architecture and configurations
- Continue low cost, high performance approach to meet mission requirements



Summary

- **Facilities and Systems Administration Branch responsibilities are broad**
- **Move to DSRC was well planned & executed**
- **Eliminating single points of failure**
- **Minimizing risks and maximizing data delivery to our customers at the lowest cost**



NOAA PROFILER NETWORK



TECHNICAL REVIEW

JANUARY 30, 2001

NOAA PROFILER NETWORK TECHNICAL REVIEW

Engineering and Field Support

**Presented by
Michael K. Shanahan**

ENGINEERING & FIELD OPERATIONS STAFF

Norman Abshire

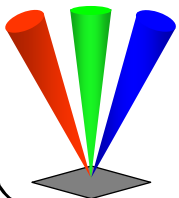
David Glaze

Scott Nahman

Brian Phillips

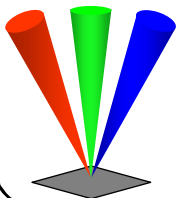
David Wheeler

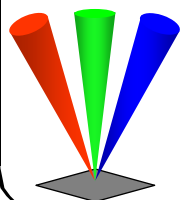
January 30, 2001



Recent Achievements

- Transitioned three Alaska profilers to NWS-AR
- Added Wolcott, IN profiler in June 1999
- Installed GPS-IPW and GSOS equipment at all network sites
- Moved Neodesha profiler to allow addition of RASS
- Installed remote reset capability of main breaker





NOAA Profiler Network

Site Visits By Visitor Type

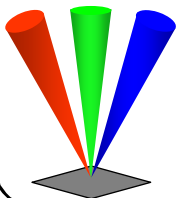
Between: 9/1/99 and 9/1/00

<u>Site Visitor Type</u>	<u>Number of Visits</u>
Auxiliary Technician	5
DOD EI-tech	21
FSL Ranger	109
FTS2000	17
GTE	1
Landowner	22
Lockheed Martin	2
NWS A-R EI-tech	34
NWS C-R EI-tech	84
NWS E-R EI-tech	2
NWS S-R EI-tech	100
Phone Company	12
Power Company	10
Total	419

Site Visits By Visitor Type

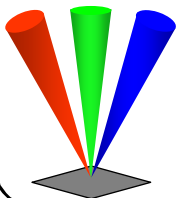
Between: 9/1/00 and 1/1/01

<u>Site Visitor Type</u>	<u>Number of Visits</u>
Auxiliary Technician	0
DOD EI-tech	8
FSL Ranger	43
FTS2000	16
GTE	0
Landowner	0
Lockheed Martin	0
NWS A-R EI-tech	3
NWS C-R EI-tech	35
NWS E-R EI-tech	0
NWS S-R EI-tech	18
Phone Company	1
Power Company	0
Total	124



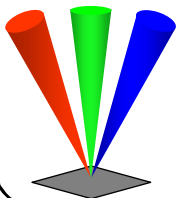
Future Improvements

- Deploy two RASS units for Neodesha, KS and Palestine, TX sites
- Upgrade all sites with GSOS II
- Install lightning and grounding protection
- Implement preventive maintenance program



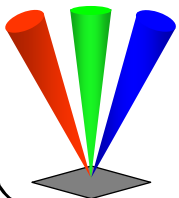
Obsolescence Issues

- Data Processor
 - OLD – Micro VAX II
 - NEW – DEC Alpha
- Signal Processor and Status Monitor
 - TORA (Technology Obsolescence Risk Assessment)
 - Integrated circuit last buys
- Transmitter
 - Purchased all 400 transistors.
 - NRC assuming repair responsibilities



Partnerships

- NRC
 - Repair of most LRU's
- NWS
 - El-Tech training program
 - Electronic "Guide to LRU Replacement"
- NWS-AR
 - Meteorologist training
 - El-Tech training



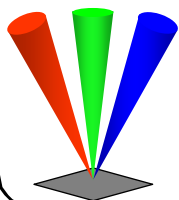
449 MHz Radar,
with Surface Met
and GPS/IPW

CENTRAL, AK

TALKEETNA, AK

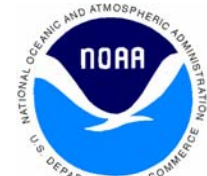
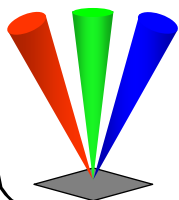
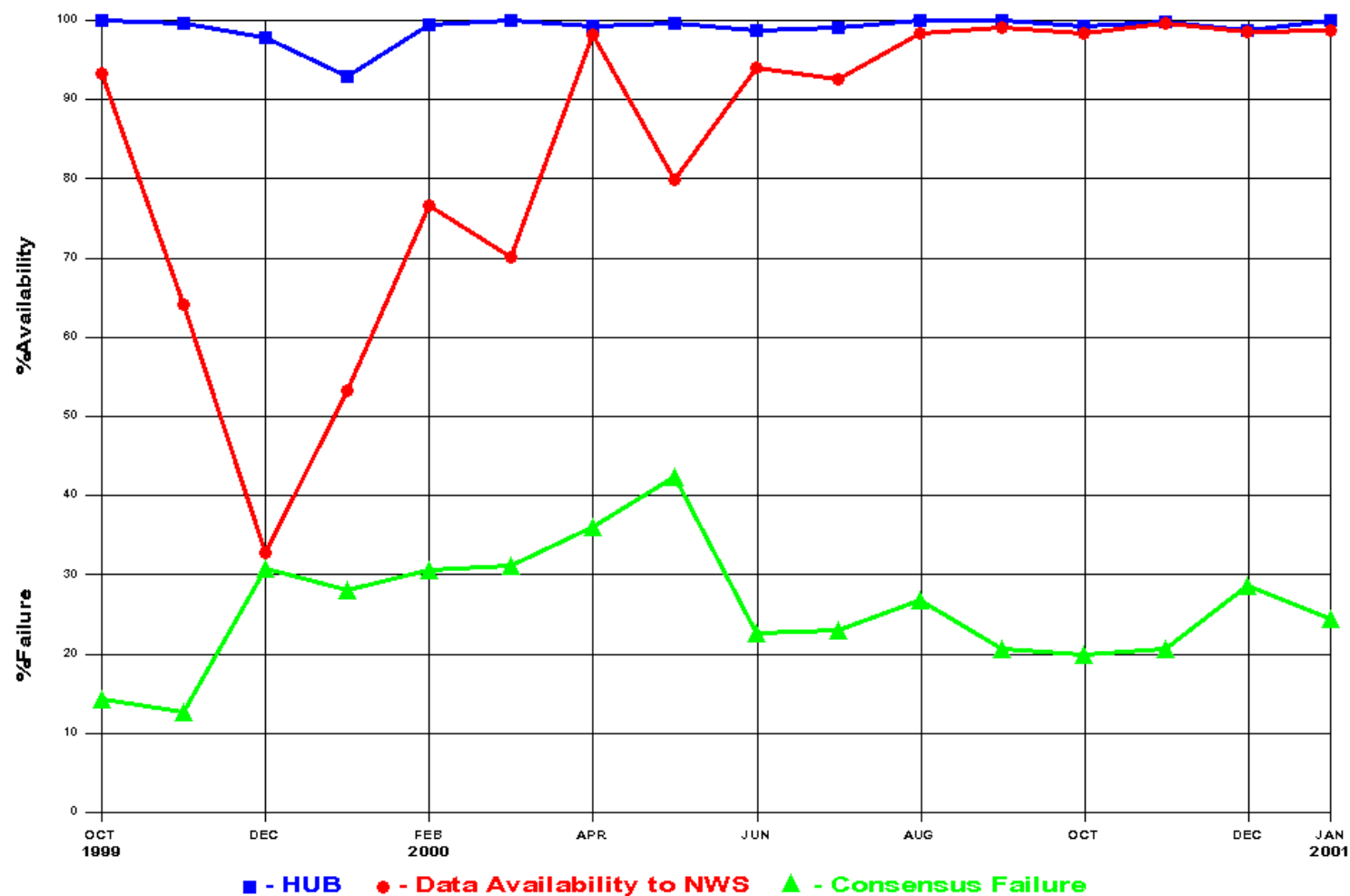
GLENNALLEN, AK

Alaska Profiler Network

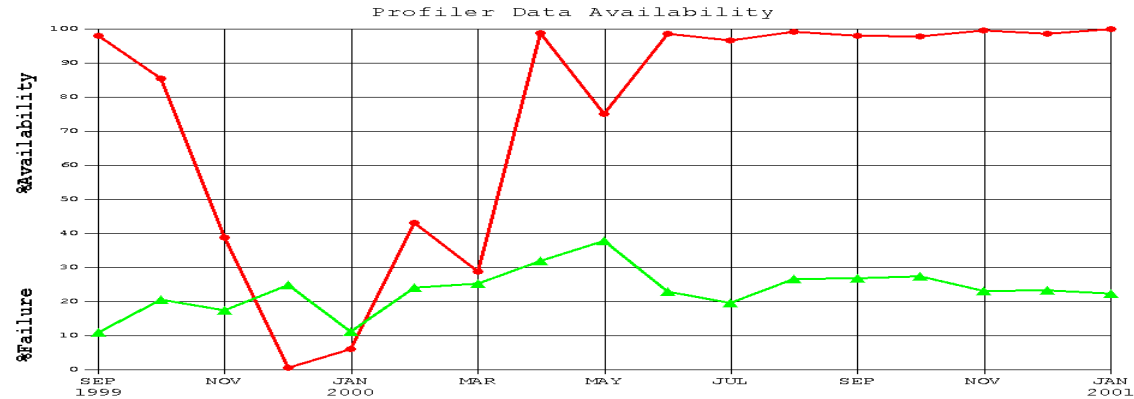


NOAA Profiler Network

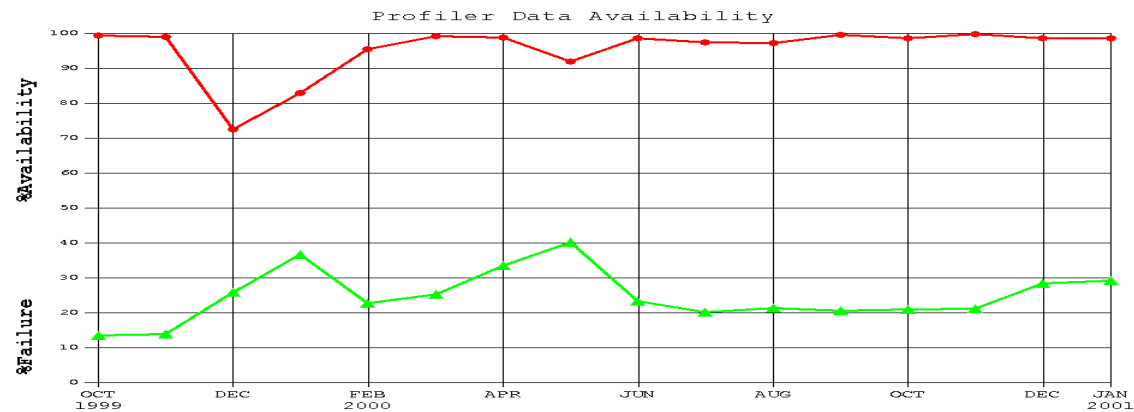
Alaskan 449 Profiler Data Availability



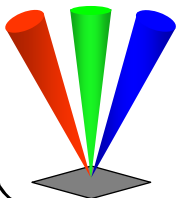
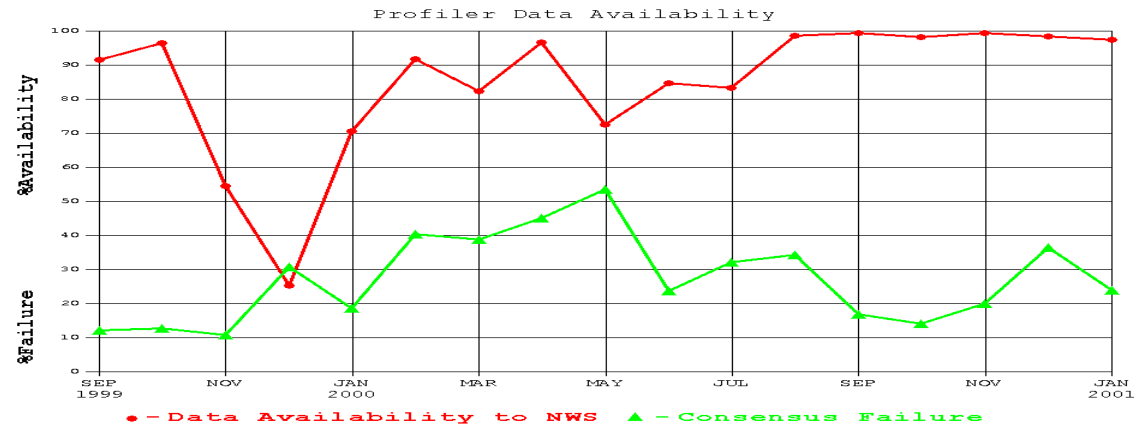
NOAA CENA2 Profiler



NOAA GNA2 Profiler

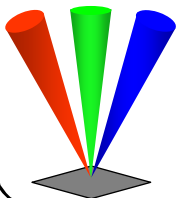


NOAA TLKA2 Profiler



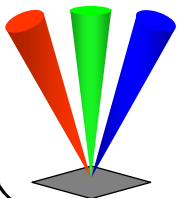
Technical Issues – Transmitter

- Problem
 - HPA and Driver Failures
- Solution
 - Reduce Power with Attenuators
 - Rework HPA and Driver
- Result
 - No downtime due to HPA or Driver

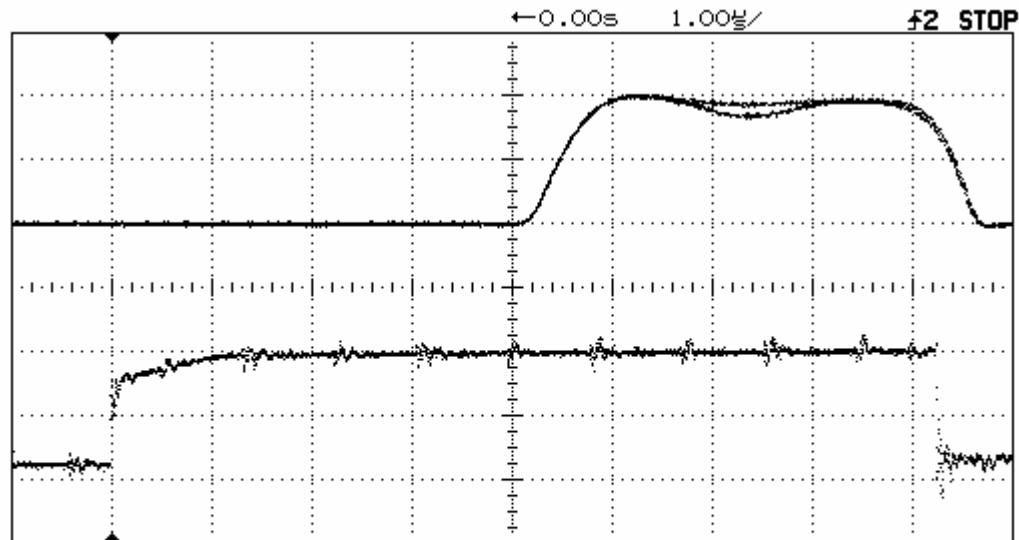


Technical Issues – Transmitter

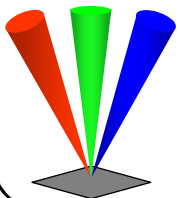
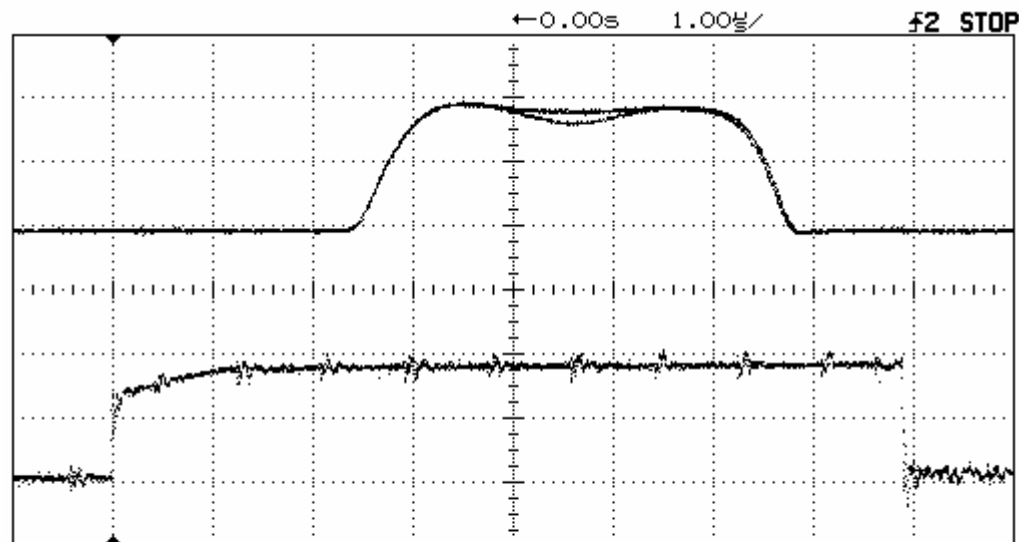
- Problem
 - Band Pass Filter Delay
 - Loss of data in first 5-7 range gates
- Solution
 - Reprogram pulse timing
- Result
 - No loss of data
 - Maintained range gate integrity



Before



After

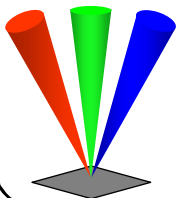


Scope traces of low mode RF pulse and T/R signals



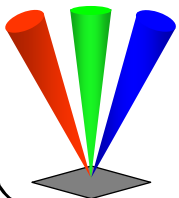
Technical Issues – Antenna

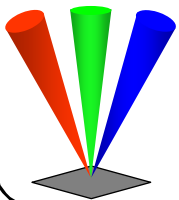
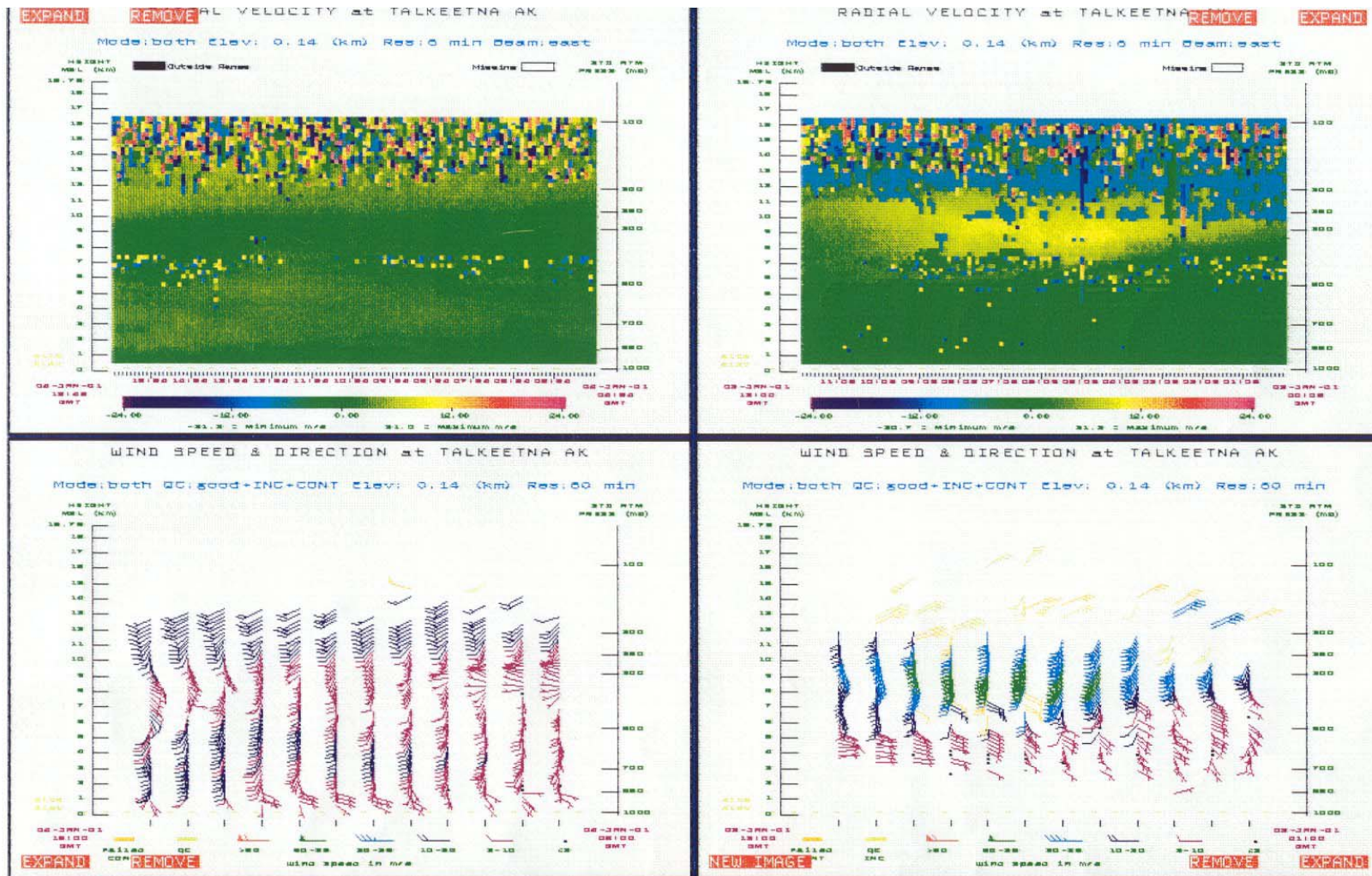
- Problem
 - Water intrusion in power dividers
- Solution
 - Seal power dividers
- Result
 - No failures since sealing

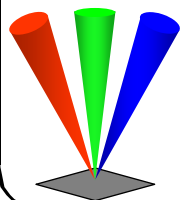


Technical Issues – Antenna

- Problem
 - Wet snow on antenna elements
 - High side-lobes and multiple trip
 - Low height coverage and data degradation
- Solution
 - Manual snow removal
- Result
 - Normal operation





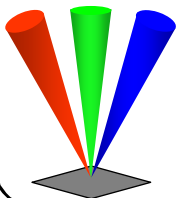


NOAA PROFILER NETWORK TECHNICAL REVIEW

Future Focuses and Summary

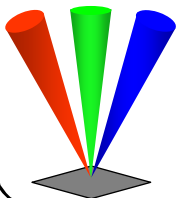
**Presented by
Margot H. Ackley**

January 30, 2001



Future Focuses

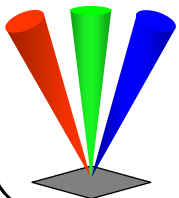
- Test new upgraded surface meteorological system designed by NWS's National Data Buoy Center
- Procure and deploy systems to all NPN sites
- Deploy modernized data systems to 11 sites
- Continue RASS optimization studies and sound mitigation efforts
- Continue data quality improvements
- Continue performing profiler impact studies with FSL/FRD
- Continue coordination with NWS on present and future support and programmatic issues



Future Focuses

National Mesoscale Observing Network Initiative (Preliminary)

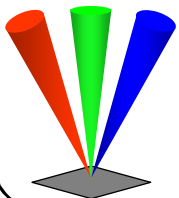
- Phase I FY- 03 —————→
 Improve Data Availability of GPS IPW
- Phase II FY- 03 —————→
 Expand GPS-IPW Network
 Convert 404 Profilers to 449
 Add RASS to 449 Profilers
- Phase III FY- 05 —————→
 Expand Profilers to Nationwide
 Mix will be both tropospheric and boundary
 layer profilers with RASS



Future Focuses

Everyday.....Continue To:

- Maintain and operate the NPN
- Add robustness to the equipment
- Fine tune monitoring procedures
- Enhance coordination with site repair staff
- Collect NPN performance statistics
- Broaden data availability



Summary

We are taking steps to assure long-term Profiler system survivability, maintainability and expansion.

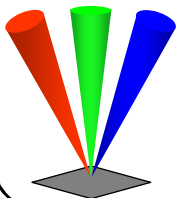
Our efforts are directed at minimizing the transition of the NPN to a NWS commissioned system.

We act as a focal point and center of excellence in profiler matters.

Our NPN has become a trusted source of data and a National resource.

“Keep the Lights Green”

“We are here to Serve”



NOAA PROFILER NETWORK



TECHNICAL REVIEW

JANUARY 30, 2001